Study on the Factors Influencing User’s Acceptance Intention for Smart Medical and Health Care Equipment Based on UTAUT2

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ABSTRACT

With the rapid development of mobile Internet technology and applications, more and more people begin to pay attention to and deepen the understanding of wearable devices, especially smart medical and health care devices. At the same time, as the extension of the traditional medical equipment, the market potential of smart medical and health care devices is huge, so it has also been paid more attention and promoted by many related industries and enterprises. However, according to the survey report, it shows that there is lower user adoption rate for the device's usage. In this study, we construct the user acceptance behavior model of smart medical and health care device, and analysis the factors influencing the adoption of smart medical and health care devices on the basis of UTAUT2 (the extended unified theory of acceptance and use of technology). In the study, we will pertinently modify the original UTAUT2 model, and add the two new constructs, including the health concern as the key features of health care equipment and the socio-economic status to carry on the research analysis. It aims to put forward suggestions on the operation and promotion of the future smart medical devices industry through the research in this paper.

INTRODUCTION

2013 is partially known as “wearable devices first year”, along with the medical care and Smart wearable devices which abstracts people’s extensive concern. Wearable health equipment arises at the historic moment, now the market has been flooded with a large number of fitness trackers and networking scales supporting for WiFi and other health care equipment, competition in medical care industry has

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become more and more fierce. Philips, the Dutch technology giant by virtue of a popular hue series which can be programmed lighting in the new field of Internet of things, now are looking to make its accumulated experience in the networking equipment manufacturing to be applied to the field of health care which it is already very familiar with. In August 2, 2016, Philips released four different kinds of Smart health care products, including a Smart analyzer of the body, a health watch, a thermometer and a blood pressure monitor. These products can be used with the Philips HealthSuite application. Philips HealthSuite applications are compatible with Android and iOS systems. The four kinds of smart networked health care products are more powerful and more beautiful appearance than previous products.

And related research on Smart medical and health care equipment will gradually increase, technology acceptance model is the basic theory which can explain and predict people's acceptance of information technology. This paper aims to explain the influencing factors of the potential and existing user’s intention to use Smart medical and health care equipment, applying the UTAUT2 approach which is the extension of Unified Theory of Acceptance and Use of Technology in the consumer context. It takes economics factors into consideration, adds socio-economic status as a construct and proposes a theoretical model by incorporating consumption theory into UTAUT2, which studies consumer acceptance by extending UTAUT. The consumption theory which is prominent in Economics provides explanation for consumers' acceptance of technology. Consumption theory suggests income (absolute income, relative income, and permanent income) to be critical to consumers’ intention. Our plan is to show that economic perspectives should be considered in analyzing consumers' acceptance and use of information technology, and empirically that the extended UTAUT2 with Consumption theory provides better explanatory value than UTAUT2 without the Consumption theory, and generate theoretical and managerial implications for future research.

LITERATURE REVIEW

In this paper we can understand IT usage behaviors in the consumer context but not in the societal context or in the organizational context. As the extension of TAM (technology acceptance model) theory, Venkatesh et al. developed UTAUT as a comprehensive synthesis of prior technology acceptance research[1]. UTAUT has four key constructs (i.e., performance expectancy, effort expectancy, social influence, and facilitating conditions) that influence behavioral intention to use a technology. Venkatesh et al. extended UTAUT to study acceptance and use of technology in a consumer context. Three constructs (i.e., hedonic motivation, price value, and habit) were incorporated into UTAUT. Individual differences—namely, age, gender, and experience—were hypothesized to moderate the effects of these constructs on behavioral intention and technology use [2]. That is UTAUT2.

Research on User adoption of IT technology is one of the hotspots in current research, and now a lot of IT technology adoption research is based on UTAUT and UTAUT2 model, and on the basis of it, other variables are introduced to explain user’s IT technology adoption willingness and behavior. Carlsson (2006) found that performance expectancy, effort expectancy significantly influence users adoption motivation of mobile service; Min et al. (2008) proposed modified UTAUT to explain user adoption of mobile commerce, on the basis of original UTAUT, the model increased the explanatory variables, including system satisfaction, customer
satisfaction, convenience and cost, user characteristics and Chinese culture; Park et al. (2007) found gender and level of education significantly moderate the role of performance expectancy, effort expectancy and social influence on user attitude based on UTAUT. Grant and Danziger (2005) based on UTAUT model study found that performance expectancy, effort expectancy, facilitating conditions and social influence have a significant impact on the use of online learning system, and the relationship between them moderated by the variable of age. AbuShanab and Pearson (2007) studied the influencing factors of Jordan user acceptance of mobile banking based on UTAUT model, and found that effort expectancy, performance expectancy, social influence and gender has a significant impact on mobile banking payment behavior of Jordan users. Im, Kim and Han (2008) considered that the UTAUT model ignored two important variables, namely, perceived risk and technology type.

**Health concern.** Health and fitness applications (apps) are one of the major app categories in the current mobile app market. Few studies have examined this area from the users’ perspective. Kharrazi et al. (2012) referred that the people pay more and more attention to their health, and Microsoft's software "healthy storage library” as a platform, it recorded personal health data, allowed consumers to keep track of their own health information, it also can safely share their health information to clinicians, nursing staff, family members and so on. Chen Nianzhao and Xiemin (2014) researched and analyzed the future development of smart health band device, and put forward that it should rationally orientate the role of the intelligent equipment in health management and promote the development of health management industry informatization. Shupei Yuan (2015) adopted the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) Model to examine the predictors of the users’ intention to adopt health and fitness apps.

**Socio-economic status (SES).** Shao, X., & Siponen, M. (2011) firstly takes economics factors into consideration, and proposes a theoretical model by incorporating consumption theory into UTAUT2. It is put forward and verified that individual’s income positively influences IT use. Ryn, M. V., & Burke, J. (2000) uses survey data to examine the degree to which patient race and socio-economic status affected physicians' perceptions of patients during a post-angiogram encounter. PA Hsieh and M Keil. (2006) proposed the differences in the behavioral models between socio-economically advantaged and disadvantaged users who have direct usage experience are theorized and empirically tested. The results reveal distinct behavioral models and isolate the key factors that differentially impact the two groups. Boo, F. L. (2016) studied the differences in cognitive development, as measured by the Peabody Picture Vocabulary Test (PPVT), between children from households with high and low socio-economic status (SES) in two different phases of early childhood in four developing countries.

In today's information age of rapid development, every day people have to face the high strength work and the complicated interpersonal relationship in workplace, fast-paced lifestyle and long-term busy lead to overdraw health and body disease. According to the “2012 mobile health report” published by the Pew Research Center in 2012, it mentioned that it has 85% of adults who have a cell phone in the United States, of which 53% is the smart phone, and half of smartphone users get the health information through the mobile phone apps. More and more people are using smart devices to focus on their health condition. And the smart health care equipment is more suitable for those busy white-collar, people at home and the persons who intend to reduce weight, it provides sleep, exercise, diet and body condition.
monitoring function, which are needed for this population. Smart health care equipment is more like a health monitoring officer who can always remind you to pay attention to your health status, and urge you to do more exercise, reasonable diet and pay attention to sleep.

MODEL FORMULATION and HYPOTHESIS DEVELOPMENT

This study is based on the extended unified theory of acceptance and use of technology (UTAUT2 model) proposed by Venkatesh et al. (2003). The UTAUT2 model has seven key constructs, four of which are from the original UTAUT model and others are specific for consumer context.

The constructs are performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit. Performance expectancy, effort expectancy and social influence explain intention to use, and that facilitating conditions and intention are direct determinants of usage behavior (Venkatesh et al. 2003). Performance expectancy indicates that a person believes that a system improves his or her performance. Effort expectancy means that a learner believes that using a system is free of effort. Social influence shows that an individual perceives important others believe he or she should use a technology. Facilitating conditions in IS research mainly refer to training, guidance, infrastructure, and help-desk support, and these facilitating conditions can improve or hinder IT use. Much research shows effect of the above factors on IT use intention and use behavior respectively (Taylor and Todd 1995; Venkatesh et al. 2003; Wang and Yang 2005; Kijsanayoting et al. 2009). Hedonic motivation is opposite to utilitarianism, referring to the fun or pleasure derived from using a technology. Many studies revealed that in the consumer context, hedonic motivation is an important determinant of technology acceptance and use (Brown and Venkatesh 2005; van der Heijden 2004; Thong et al 2006; Childers et al. 2001). Price value means the perceived benefit of using technology compared with its cost (Dodds et al. 1991). Habit is considered to be a perceptual construct that reflects the results of prior experiences (Venkatesh et al. 2011), which is a strong predictor of future technology use (Kim and Malhotra 2005; Limayem et al. 2007).

The model consists of four moderators, that is age, gender, experience and voluntary, and dependent variable, that is intention of use. In order to make better use of the model, before constructing the complete user acceptance and use model of smart healthcare equipment, the original UTAUT2 model do a few changes, that is respectively: (1) due to the smart health care equipment is the product using information technology to build and complete, the user does not need to cooperate with construction equipment, therefore the construct Facilitating conditions in the original model is not suitable for use in this study, it is to be deleted combined with practical considerations. (2) according to the characteristics of smart medical and health care equipment, this paper adds the new construct of health concern to UTAUT2. (3) it takes economics factors into consideration and proposes a theoretical model by incorporating consumption theory into UTAUT2, adding the new variable socio-economic status to carry on the research analysis. (4) In this paper, usage intention is the final construct rather than usage behavior, the variable habit is dropped. (5) Because of the characteristics of smart healthcare equipment, the
The construct of personal innovativeness is incorporated into the research model. (6) There are three moderators in UTAUT2 in this paper, including age, personal innovativeness and socio-economic status, specially emphasized that socio-economic status is not only an independent variable, but also a moderator.

In this section, we present the theoretical framework, Figure 1 presents the research model.

Thus the following hypothesis can be proposed:

*Hypotheses related to reserved constructs:*

H1: Performance expectancy of users is positive related to acceptance intention;
H2: Effort expectancy of users is positive related to acceptance intention;
H3: Social influence is positive related to acceptance intention;
H4: Hedonic motivation is positive related to acceptance intention;
H5: Price value is positive related to acceptance intention.

*Hypotheses related to added constructs:*

H6: Health concern of users is positive related to acceptance intentions;
H7: SES (Socio-Economic Status) of users is positive related to acceptance intention.

*Hypotheses related to moderators:*

H8: Age has a significant moderating effect on the measurement model;
H9: Personal Innovativeness has a significant moderating effect on the measurement model.
H10: SES (Socio-Economic Status) has a significant moderating effect on the measurement model.

**CONCLUSIONS**

IT acceptance is widely studied topic on IS. The key theory in the area of IT acceptance is UTAUT. We propose a theoretical model by extending UTAUT2 in a consumer context. This paper constructs a research model to analyze the factors
influencing user’s acceptance intention for smart medical and health care equipment based on UTAUT2.

We will conduct questionnaire design and collect data by way of questionnaire survey for further research. SPSS will be used for doing reliability analysis, validity analysis, correlation analysis, regression analysis, t-test and analysis of variance (ANOVA) of the input data from valid questionnaires, and the results of the above research are discussed so that we can find out the factors that affect the potential users’ acceptance to use smart health care equipment and old users to continue to use the smart health equipment.

This paper analyzes the influencing factors of user’s acceptance intention for Smart medical and health care equipment based on the extended unified theory of acceptance and use of technology (UTAUT2). From which we can understand the users’ intention and behavior. It can be used to make some suggestions for development strategy of medical and health care equipment industry.

REFERENCES