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Factors Influencing the Adoption of IoT Based Mobile Health Services in China: A Conceptual Framework

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Abstract
Purpose: This paper aims to explore the factors influencing users' behavioral intentions in adopting mobile health services in China by using UTAUT (Unified Theory of Acceptance and Use of Technology) model and PMT (Protection Motivation Theory) theory. Accordingly, a unified model combining technology acceptance theory and health behavior theory is developed.
Design/methodology/approach: Based on the UTAUT model as the basic theoretical framework, this paper proposes hypotheses and research models, and discusses various factors that influence the behavior intention of Chinese users to adopt mobile health services from the perspective of ordinary users. This study uses the questionnaire survey method to collect relevant samples in Zaozhuang City, Shandong Province, China, using online questionnaires and on-site distribution.
Findings: It is expected that finding from the study would be beneficial to medical institutions and service providers develop mobile health products that are more suitable for the Chinese market and Chinese users and provide basis and data support for the formulation of regulatory policies by government departments, and contribute to the informatization of health services.
Originality/value: This study proposes an extended theoretical model based on UTAUT model and integrating PMT theory to explore the factors affecting users' willingness to adopt mobile health in China from technology acceptance theory and health behavior theory. Therefore, the extended model has greater prediction ability. It is an extension of UTAUT's relevant dimensions in the study of mobile health users' adoption intention.

Keywords: Mobile health, PMT, UTAUT, Adoption

Introduction

Mobile Health has been recognized by the WHO as an effective way to manage health (Consulting, 2014). Mobile health service is a relatively broad concept. The Healthcare Information and Management Systems Society defined mobile health as providing medical services and medical information through mobile communication technologies, such as patient monitoring devices, personal digital devices, mobile phones, and satellite communications. Specifically, in mobile Internet, medical and health applications based on mobile terminal systems and their connected medical devices and sensors are mainly used (Kay, Santos, & Takane, 2011). Chinese scholars also pointed out that mobile health applications use remote communication technology to transmit information and interact with remote medical services. Specifically, it uses mobile devices to collect signals and data such as user's breathing, blood pressure, and ECG in real-time and uses mobile network technology to convert physiological data into digital signals, which are transmitted and shared through the mobile Internet to achieve the ultimate goal of telemedicine and health management (Li & Chen, 2015). It can be seen that the definition of mobile health service is covered by the concept of the medical Internet of Things (IoT), and the development of the medical IoT provides the infrastructure for mobile health service. The medical Internet of Things' technical architecture and application architecture covers the hardware technology paradigm and application scope required by mobile health services. Mobile health services have effectively penetrated mobile technology into the medical field, helping to reduce medical costs, improve medical standards, and facilitate patients' access to medical services (Akter, D'Ambra, & Ray, 2010; Kumar et al., 2013). The effective combination of information technology and medical treatment to promote personalized medicine is the most significant opportunity for Mobile health services, but it also faces many problems at the same time. According to related surveys, only 29.8% of consumers in China insist on using mobile health for their health management. About 70% of consumers have almost no understanding of mobile health, but these consumers also show great interest in mobile health (Yang, Yang, Zhang, & Wang, 2019).

Many mobile health applications that provide medical services can play an influential role in monitoring users' sleep, diet, and exercise. Through the mobile application, it is possible to obtain and update patient records, input diagnosis and treatment results, monitor the patient's condition, and provide medical information to support the work of medical practitioners. Users can improve the efficiency of medical treatment and reduce medical costs through mobile health applications. Although the superiority of mobile health services is generally recognized, the widespread use of mobile health services has not yet achieved the expected results (Craig, 2008).

The research on the adoption of information technology has become a core theme in information system research for more than two decades. Understanding the user's information technology adoption behavior has crucial positive significance because only the users first adopt and accept these information technologies can obtain the expected benefits in the subsequent use process, and the user's adoption and acceptance behavior is a prerequisite for achieving benefits (Bhattacherjee & Sanford, 2006). Studying the user's information technology adoption behavior is of great significance to its future application and development. Although the research on mobile health services has attracted more and more attention from scholars, the related research results are relatively fragmented and lack a more systematic and complete overall research framework. In addition, the discussion on the factors that influence people's adoption of mobile health services is not comprehensive and thorough (Liu, Gao, & Xu, 2005). At present, Chinese scholars' research on mobile health mainly focuses on: platform optimization (Dai & Hou, 2018; Jin & Ma, 2017; Xie, Lu, & Hu, 2018), risk supervision (Wang & Hou, 2018; Wang, Li, & Dong, 2018; Zhu, Liu, Chen, & Du, 2018), intervention and

application of specific diseases (Wang, Li, & Zhou, 2018; Yu, Zhong, Wang, Zhao, & Feng, 2020). There are few analytical studies on usage behavior (Jiang, Li, Zhong, & Zeng, 2018).
Mobile health service is derived from the research field of the intersection of management information systems and medical health, and the factors affecting mobile health's adoption behavior services are multi-sourced. A review of the literature found that when previous researchers explain users' adoption intentions for mobile health, they often only explain their adoption intentions from the perspective of innovative technology acceptance, while ignoring the impact on users' adoption decisions when the technology is applied for medical health instead of other purposes. Nutbeam (1998) defined healthy behavior as "any activity undertaken by an individual, regardless of actual or perceived health status, for the purpose of promoting, protecting or maintaining health, whether or not such behavior is objectively effective towards that end." The users who adopt mobile health services take behavior that promotes, protects, or maintains health under a known or perceived health condition. Thus, the adoption of mobile health services should also be a healthy behavior (Scammon et al., 2011).
In order to distinguish the behavioral intention of health service technology from other technologies, researchers should combine the technical perspective and the health behavior perspective to analyze the behavioral intentions of users adopting health service technology (Holden & Karsh, 2010). Protective motivation theory (PMT) is often used to study the impact of safety motivation on human behavior (Johnston & Warkentin, 2010) and is widely used in health and environmental fields (Anderson & Agarwal, 2010). However, the PMT is rarely studied in the situation of mobile health. This study combines UTAUT and PMT to deeply explore the adoption behavior intention of mobile health from the perspective of health behavior.

Literature Review

Technology Acceptance Theory System

The research on user behavior intention is mainly from the perspective of technology or social psychology. The main theories of this kind of research are TRA (theory of reasoned action), TPB (theory of planned behavior), TAM (technology acceptance model), TAM2 (technology acceptance model 2), UTAUT (unified theory of technology acceptance and use of technology), IDT (innovation diffusion theory), TFT (test/technology fit) (Sun, Wang, Guo, & Peng, 2013). TRA believes that people's behavior is often made after rational thinking, predicted and control. By measuring whether people intend to take a certain action, we can predict whether people will take this behavior, and the behavior intention is usually determined by behavior attitude and subjective norms. Behavioral attitude is a subjective factor, which represents an individual's positive or negative evaluation of the practice of a specific behavior; subjective norms are an objective factor that affects the social pressure felt by the individual (Ajzen & Fishbein, 1975). TPB is derived from the rational behavior theory TRA, based on the TRA, the perceived behavioral control (PBC) is added. The TPB believes that in addition to the subjective norm and attitude determining user behavior intention, perceived behavioral control also affects users' behavior intentions and actual behavior (Ajzen, 1991). The TAM is improved based on the TRA and proposes that perceived ease of use and perceived usefulness determine attitudes (Davis, 1989). TAM2 adds subjective norms based on the technology acceptance model (TAM), and the UTAUT believes that technology acceptance behavior is mainly affected by performance expectations, social influence, effort expectations, and convenience conditions (Venkatesh, Morris, Davis, & Davis, 2003).
Previous empirical researches on health information technology users' acceptance behavior have primarily been analyzed from the perspective of technology acceptance theory. For instance, Kim and Chang (2007) studied the acceptance behavior of health information technology from consumers' perspective based on the TAM and found that perceived

usefulness rather than perceived ease of use positively affected satisfaction. Klein (2007) also examined consumers' behavioral intention to health information technology from the perspective of technology acceptance. The research shows that perceived usefulness positively affects behavioral intention. Based on the TAM and the planned behavior theory (TPB), Hung, Ku, and Chien (2012) analyzed the acceptance behavior of health information technology by medical professionals. The results revealed that attitude, subjective norms, and perceived behavior control positively influenced the adopt intention.

Protection Motivation Theory

The health belief model (HBM) was first used to explain and predict health behavior. Researchers first used this model to explain why people are unwilling to participate in various disease prevention. Later, it was widely used to predict and change various health risk behaviors. HBM believes that when the individual perceives the severity of the disease and believes that adverse results are more likely to occur, and feel that adopting healthy behaviors may bring many benefits when the cost of adopting behaviors is small, healthy behaviors will be easier to happen (Champion & Skinner, 2008).

Rogers (1975) proposed the protection motivation theory (PMT) based on HBM, which explains how an individual's fear appeal affects their related health behaviors, such as dieting, quitting smoking and drinking, or other behaviors that threaten their health. PMT is widely used in areas other than healthy behaviors, the theory holds that when individuals perceive a threat, they will have an intention to protect behavior. The motivation of protection is composed of the process of cognitive evaluation of the experience when facing threats, this cognitive process is divided into threat appraisal and coping appraisal. Threat appraisal is to evaluate an inappropriate behavior, such as smoking. The factors of threat assessment are adaptive internal and external rewards, perceived vulnerability, and perceived severity. Reward factors increase the possibility of choosing adaptive behaviors, while threat factors reduce this possibility (Floyd, Dunn, & Rogers, 2000). The coping appraisal refers to assess the individual's ability to cope with threats and dangers, and it includes response costs, response efficacy, and self-efficacy; Response costs refer to all the costs of adopting adaptive behaviors, such as time, money, energy; Response efficacy refers to the individual's perception of whether a particular protective behavior is effective; Self-efficacy increases the likelihood of adopting adaptive behavior (Floyd et al., 2000). Specifically, the PMT believes that individuals' appraisal of the vulnerability and severity of potential threats (threat appraisal) and their ability to perform certain behaviors in response to health threats (response appraisal) will determine their intention to protect the health, which in turn affects whether they adopt healthy behaviors (Maddux & Rogers, 1983). The PMT is the expansion and extension of the health belief theory. Both pay attention to individual belief, indicating that the cognitive process regulates attitude and behavior change, and both include the measurement of the benefits and costs brought by behavior change. The difference is that the health belief model focuses on cognitive factors and simplifies behavior change. At the same time, the protection motivation theory pays more attention to the regulation of cognition and considers the impact of social and environmental factors on individual behavior as much as possible. The PMT believes that the health threat information from the social environment can support individuals to assess the vulnerability and severity of threats. Thus, the PMT can better explain and predict healthy behaviors than the HBM (Prentice & Rogers, 1986).

PMT is one of the most influential explanatory theories to study the behavior intention of individuals to adopt protective behaviors (Anderson & Agarwal, 2010). Yoon, Hwang, and Kim (2012) have shown that if students perceive high threat severity levels, response effectiveness, response cost, and self-efficacy, they are more willing to perform information security behaviors. Ifinedo (2012) integrates PMT and TPB to study employees' acceptance of

information system security policies and finds that self-efficacy, attitudes, subjective norms, response effectiveness, and perceived vulnerability positively affect employees' intention to conduct information system security policies. Sun et al. (2013) have also studied the influencing factors of behavioral intention of users to mobile health services that was based on PMT and TAM.

Conceptual Framework and Hypothesis Development

The behavior of using mobile health services is both an innovative technology acceptance behavior and healthy behavior. In order to explain this behavior more comprehensively, it is necessary to integrate the technology acceptance theory and the healthy behavior theory. In order to form a more comprehensive explanatory model, Table 1 compares the common theories used to explain the two behaviors. As shown in Table 1, different variables are used in different theories, but these variables have similar meanings. For example, Both TAM and TPB contain attitude variables, which refer to the individual's positive or negative feelings about performing the target behavior, and attitude variables are affected by perceived usefulness and perceived ease of use (Davis, 1989). The performance expectation in UTAUT is similar to the concept of perceived usefulness, which means that users believe that mobile health services will help improve their health level (Venkatesh et al., 2003). The response efficiency in PMT refers to using mobile health services that can reduce the threat of diseases to their health (R. W. Rogers, 1975). Thus, these three variables are similar in concept. In TPB, perceived behavioral control refers to the perception of an individual's ability to control the required resources and opportunities when engaging in a specific behavior, in addition to personal desire and intention, it also includes non-motivational factors beyond personal control, such as time, money, skills, opportunities, abilities, resources or policies, which are related to the control of personal behavior. Therefore, even if an individual wants to engage in a specific behavior, he or she will eventually be unable to actually engage in the behavior due to the lack of ability to control resources (Ajzen, 1991). Perceived behavioral control is similar to the meaning of the facilitating conditions in UTAUT, both refer to the degree to which individuals feel that the organization supports the use of the system in terms of related technologies and equipment (Venkatesh et al., 2003). In addition, the limitation of behavior control perception can be divided into self-efficacy and external resources, the former refers to the perception of whether one can complete the behavior, and the latter refers to the availability and hindrance of the resources available to individuals (Ajzen, 2002). These factors are conceptually similar to self-efficacy and response costs in PMT. Therefore, to form a unified theory, it is necessary to merge different variables with overlapping meanings.

Table 1: A comparison of theories

Unified Model's Determinants	Constructs	TAM	PMT	TPB/UTAUT
Perceived Usefulness	Performance Expectancy/ Response Efficacy	√	√	√
Perceived Ease of Use	Effort Expectancy	√		√
Subjective Norm	Social Influence			√
Facilitating Conditions (Perceived Behavioral Control)	Self-Efficacy (Internal)		√	√
	Response Cost (External)		√	√

The comparison between models can be found in Table 1: TAM includes the utility of the explained behavior and the difficulty of adopting the behavior and lacks the explanation for the

user's own perceived behavioral control and social influence. PMT does not include subjective norm and effort expectancy, so the unified model (Figure 1) is expected to have more substantial explanatory power than other models.

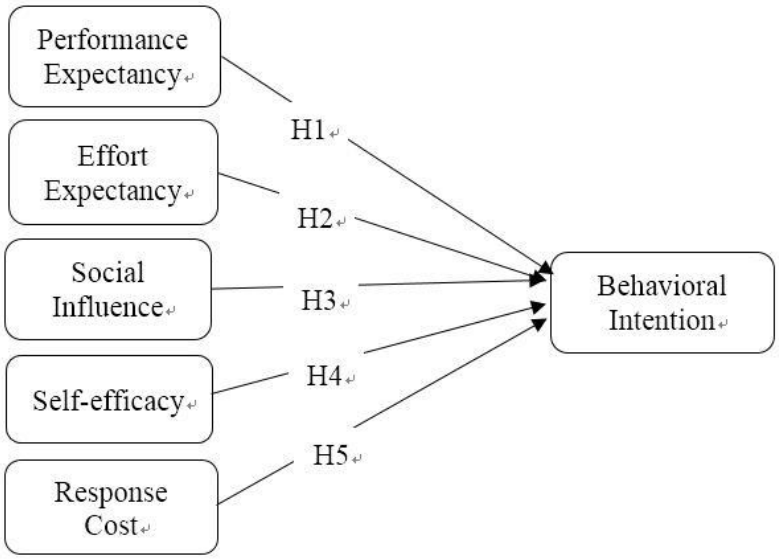

Figure 1: conceptual framework of the study

Performance Expectancy

Performance expectancy (PE) refers to the degree to which users think the system is beneficial to their work performance (Venkatesh et al., 2003). In the situation of mobile health, PE is expressed as the user's belief that the system helps to understand their physical condition, save time for medical treatment, promote doctor-patient communication, and enable users to receive more accurate, appropriate, and fast services. Many researchers have confirmed the positive influence of performance expectations on user behavioral intentions. Ming, Guo, and Wang (2018) confirmed that performance expectations significantly affect the behavior intentions of university mobile library users; Zhu and Guo (2016) believe that performance expectations positively affect users' behavioral intentions in using mobile government systems. Generally speaking, when users think that mobile electronic health services can help them obtain more high-quality and efficient services, they will use this system. Therefore, we hypothesize that:
H1: The PE of users is positively correlated with the behavioral intention of adopting mobile health.

Effort Expectancy

Effort expectancy (EE) refers to the degree to which users think the system is easy to use. (Venkatesh et al., 2003). In the situation of mobile health, efforts to expect performance are expressed as to how easy it is for users to learn how to use the system in a transparent and easy to operate system. Many researchers have confirmed the positive impact of effort expectancy on user behavioral intentions. Bao (2017) confirmed that effort expectancy positively affects users' mobile learning; Li, Zhou, and Bao (2018) studied the consumer acceptance of wearable devices, they confirmed that effort expectancy positively influences consumers' acceptance of intelligent products. Generally speaking, users will consider the cost of effort when they contact mobile electronic health services. When users think that the system is simple and easy to use and it takes less effort to learn to use it, they will tend to use it. Therefore, we proposes that:
H2: The EE of users is positively correlated with the behavioral intention of using mobile health.

Social Influence

Social influence (SI) refers to the degree to which individuals perceive that people around them recognize their use of new technologies (Venkatesh et al., 2003). In the situation of mobile health, social influence is expressed as the user's perception of the degree of recognition of the use of the system by the people who have an important influence on it, that is, the opinions of classmates, friends, colleagues will also become a critical factor in the user's decision-making. Tan, Zhang, and Zeng (2014) onfirmed that social influence is positively correlated with intention to use when studying the factors that influence users' online shopping; Lv and Chen (2016) did research on the influencing factors of travel apps, they found that social influence has a positive effect on user trust, and the opinions of others easily influence the degree of user acceptance of new technologies. Generally speaking, the opinions and suggestions of people who have an important influence on the user can often affect the user's trust in the system and intention to use the system. Thus, we posit that:

H3: The SI of users is positively correlated with the behavioral intention of adopting mobile health.

Self-efficacy

Self-efficacy refers to the perception of an individual's ability to take a specific protective behavior: the individual's judgment, belief, and subjective self-feeling about the level of completing this behavior activity before implementing a particular behavior operation. Self-efficacy focuses on evaluating the individual's intrinsic ability to implement protective behaviors (Ifinedo, 2012). Self-efficacy is the core of PMT. Previous studies have shown that self-efficacy significantly impacts the adoption intention of information systems (Compeau & Higgins, 1995; Workman, Bommer, & Straub, 2008). In the situation of mobile health, self-efficacy refers to the cognition of an individual's ability to make healthy behaviors. If users believe that specific behavior is beneficial to protect their health and are confident of protecting their health from external threats, they may be more willing to accept this healthy behavior. Therefore, this article proposes that:

H4: The self-efficacy of users is positively correlated with the behavioral intention of adopting mobile health.

Response Cost

Response cost measures the cost perceived by an individual when he/she takes protective actions, such as time, money, energy, obstacles to use (Zhang & McDowell, 2009). Perceived costs will reduce users' intention to take action to respond to threats. If people need to pay more for protective actions, they usually hesitate to take them (Peace, Galletta, & Thong, 2003). In the situation of mobile health, the response cost is mainly the time and money that people need to spend to learn and use mobile health services. People may be less willing to use mobile health if they feel that they have to put in more effort to learn this emerging technology or spend more money to use health services (R. W. Rogers, 1975; Sun et al., 2013). Conversely, if fewer resources are needed to implement protective measures, people may be willing to adopt such measures (Pechmann, Zhao, Goldberg, & Reibling, 2003; Workman et al., 2008). Thus, We posit that:

H5: The response cost of users is negatively correlated with the behavioral intention of using mobile health.

Methods

This paper uses the UTAUT model as the basic theoretical framework, proposes hypotheses and research models, and discusses various factors that affect Chinese users' behavioral intentions in adopting mobile health services from the perspective of ordinary users. This study adopts the method of the questionnaire survey, prepare relevant questionnaires based on the existing mature model and questionnaire mode. Since mobile health is a new medical service model, and ordinary users are not clear about its service model, a scenario description will be set at the beginning of the questionnaire to allow users to have a deeper understanding of the concept of mobile health, the services it can provide, and the benefits it brings, so that the collected sample data will be more accurate. Finally, a questionnaire survey was conducted in Zaozhuang City, Shandong Province, China, using online questionnaires and on-site distribution to collect relevant samples.

Findings

It is expected that finding from the study would be beneficial to medical institutions and service providers develop mobile health products that are more suitable for the Chinese market and Chinese users and provide the basis and data support for the formulation of regulatory policies by government departments and contribute to the informatization of health services.

Conclusion

With the development of IT and the emergence of mobile health, mobile health services have attracted widespread attention from the research community. However, there are few studies on the relationship between health behavior theory and mobile health adoption. Therefore, in this study, to more comprehensively explain the behavioral intention of Chinese users to adopt mobile health services, we combined technology acceptance theory and health behavior theory to establish an extended model based on UTAUT. By comparing various theories, the extended model integrates the various variables of UTAUT and PMT theories, and has better interpretation and prediction capabilities than other alternative models.

Theoretical Contributions

In the past, most of the researches on the behavior intention of mobile health service users used the technology acceptance model or the planned behavior theory to carry out research. However, the technology acceptance model TAM is mainly biased towards analyzing the user's technology adoption behavior based on the perspective of technology acceptance. As an activity to promote, protect and maintain health, mobile health service adoption behavior is far from enough to analyze from the perspective of technology. It should be studied from the health behavior's perspective. Therefore, this article integrates the PMT and UTAUT theories to analyze the behavioral intention of users to use mobile health services for health management.

Practical Implications

Mobile health services have eased the pressure of the healthcare industry to a certain extent, improved the service quality and level of the healthcare industry, expanded the scope of healthcare services, and enhanced the communication and trust between doctors and patients, and promoted the development of the healthcare industry develop. This study analyzes the behavioral intention of adopting mobile health services that is based on ordinary users' perspective. The research results can prompt service providers to optimize and supplement services for essential factors that affect users' adoption intentions. At the same time, it can also be used for decision-making departments to introduce relevant systems and measures for various factors that hinder users' adoption intentions so that users can actively participate in

self-health management, so as to realize the advantages of mobile health, such as reducing medical costs, facilitating doctor-patient communication, improving medical standards and balancing medical resources.

Limitations and Suggestions for Future Research

Users of mobile health services can be divided into medical professionals and ordinary users according to professional knowledge. Medical professionals have certain medical professional knowledge, and the factors affecting the intention of medical professionals to adopt mobile health behavior are different from ordinary users. This research only focuses on the perspective of ordinary users who have absolute advantages in quantity to explain various factors affecting their intention to adopt mobile medicine, and it is also of great significance to explore the intention of medical professionals to adopt mobile medicine. In the future, the intention of medical professionals can be studied in detail.

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References

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior human decision processes, 50*(2), 179-211.

Ajzen, I. (2002). Residual effects of past on later behavior: Habituation and reasoned action perspectives. *Personality social psychology review, 6*(2), 107-122.

Ajzen, I., & Fishbein, M. (1975). A Bayesian analysis of attribution processes. *Psychological bulletin, 82*(2), 261.

Akter, S., D'Ambra, J., & Ray, P. J. E. M. (2010). Service quality of mHealth platforms: development and validation of a hierarchical model using PLS. *20*(3-4), 209-227.

Anderson, C. L., & Agarwal, R. (2010). Practicing safe computing: A multimethod empirical examination of home computer user security behavioral intentions. *MIS quarterly*, 613-643.

Bao, R. (2017). Research on the influencing factors of learners' willingness to use mobile learning in Open Education *Journal of Distance Education, 35*(03), 102-112.

Bhattacherjee, A., & Sanford, C. (2006). Influence processes for information technology acceptance: An elaboration likelihood model. 805-825.

Champion, V. L., & Skinner, C. S. (2008). The health belief model. *Health behavior health education: Theory, research, practice, 4*, 45-65.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS quarterly*, 189-211.

Consulting, V. (2014). mHealth for Development: The Opportunity of Mobile Technology for Healthcare in the Developing World. Washington, DC and Berkshire, UK: UN Foundation–Vodafone Foundation Partnership, 2009.

Craig, S. (2008). Mobile technology and healthcare: the adoption issues and systemic problems. *4*(3-4), 221-235.

Dai, J., & Hou, Y. (2018). Mobile medical operation mode and business path analysis In *Health economic research* (pp. 39-43).

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Floyd, D. L., Dunn, S., & Rogers, R. W. (2000). A meta‐analysis of research on protection motivation theory. *Journal of applied social psychology, 30*(2), 407-429.

Holden, R. J., & Karsh, B.-T. (2010). The technology acceptance model: its past and its future in health care. *Journal of biomedical informatics, 43*(1), 159-172.

Hung, S., Ku, Y., & Chien, J. (2012). Understanding physicians' acceptance of the Medline system for practicing evidence-based medicine: A decomposed TPB model. *International journal of medical informatics, 81*(2), 130-142.

Ifinedo. (2012). Understanding information systems security policy compliance: An integration of the theory of planned behavior and the protection motivation theory. *Computers Security, 31*(1), 83-95.

Jiang, Y., Li, Q., Zhong, Y., & Zeng, G. (2018). Investigation on cognition and use of mobile medical service app among middle-aged and elderly people in Beijing *Medicine and Society, 31*(11), 11-14.

Jin, H., & Ma, L. (2017). Application of mobile medical app upgrade in digital outpatient service. *Chinese medical equipment, 14*(02), 100-103.

Johnston, A. C., & Warkentin, M. (2010). Fear appeals and information security behaviors: An empirical study. *MIS quarterly*, 549-566.

Kay, M., Santos, J., & Takane, M. (2011). mHealth: New horizons for health through mobile technologies. *World Health Organization, 64*(7), 66-71.

Kim, D., & Chang, H. (2007). Key functional characteristics in designing and operating health information websites for user satisfaction: An application of the extended technology acceptance model. *International journal of medical informatics, 76*(11-12), 790-800.

Klein, R. (2007). An empirical examination of patient-physician portal acceptance. *European Journal of Information Systems, 16*(6), 751-760.

Kumar, S., Nilsen, W. J., Abernethy, A., Atienza, A., Patrick, K., Pavel, M., . . . Swendeman, D. (2013). Mobile Health Technology Evaluation. *American Journal of Preventive Medicine, 45*(2), 228-236. doi:10.1016/j.amepre.2013.03.017

Li, L., & Chen, Y. (2015). Research on the Status Quo of Mobile Medical Development in China and Relevant Strategies Based on the 4G Network Background. *China Medical Devices, 30*(08), 73-76. doi:10.3969/j.issn.1674-1633.2015.08.022

Li, P., Zhou, Q., & Bao, D. (2018). Research on User Acceptance of Wearable Devices Based on UTAUT Model——Taking Smart Jewelry as an Example. *Gemology journal, 20*(04), 55-62.

Liu, W., Gao, P., & Xu, B. (2005). A summary of research on enterprise information technology adoption behavior In *Research and development management* (pp. 52-58).

Lv, L., & Chen, Y. (2016). Research on Influencing Factors of initial trust of reservation tourism app users. *Seeker*(10), 112-117.

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of experimental social psychology, 19*(5), 469-479.

Ming, J., Guo, C., & Wang, X. (2018). An empirical study on user intention of mobile library based on UTAUT *Library Science Research*(22), 81-90.

Nutbeam, D. (1998). Health promotion glossary. *Health promotion international, 13*(4), 349-364.

Peace, A. G., Galletta, D. F., & Thong, J. Y. (2003). Software piracy in the workplace: A model and empirical test. *Journal of Management Information Systems, 20*(1), 153-177.

Pechmann, C., Zhao, G., Goldberg, M. E., & Reibling, E. T. (2003). What to convey in antismoking advertisements for adolescents: The use of protection motivation theory to identify effective message themes. *Journal of marketing, 67*(2), 1-18.

Prentice, D., Steven, & Rogers, R. W. (1986). Protection motivation theory and preventive health: Beyond the health belief model. *Health education research, 1*(3), 153-161.

Rogers. (1975). A protection motivation theory of fear appeals and attitude change. *The journal of psychology, 91*(1), 93-114.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change1. *The journal of psychology, 91*(1), 93-114.

Scammon, D. L., Keller, P. A., Albinsson, P. A., Bahl, S., Catlin, J. R., Haws, K. L., . . . Marketing. (2011). Transforming consumer health. *30*(1), 14-22.

Sun, Y., Wang, N., Guo, X., & Peng, Z. (2013). Understanding the acceptance of mobile health services: a comparison and integration of alternative models. *Journal of electronic commerce research, 14*(2), 183.

Tan, Zhang, J., & Zeng, Y. (2014). Research on Influencing Factors of consumers' online shopping based on UTAUT model. *Management modernization, 34*(03), 28-30.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Wang, & Hou, Y. (2018). Problems and suggestions in the development of mobile medicine. *Chinese Journal of health informatics & management, 15*(03), 309-312.

Wang, Li, A., & Dong, Y. (2018). Current situation and problem analysis of mobile medical app based on medical service chain. *Chinese Hospital Management | Chin Hosp Manag, 38*(07), 48-49.

Wang, Li, N. N., & Zhou, J. (2018). Research progress of mobile medicine in symptom management of cancer patients. *Journal of Nursing Science, 33*(23), 95-98.

Workman, M., Bommer, W. H., & Straub, D. (2008). Security lapses and the omission of information security measures: A threat control model and empirical test. *Computers in Human Behavior, 24*(6), 2799-2816.

Xie, J., Lu, C., & Hu, Y. (2018). Current situation and development of mobile medical app in hospital outpatient department. In *Chinese Hospital* (Vol. 22, pp. 78-80).

Yang, Y., Yang, Y., Zhang, H., & Wang, W. (2019). Analysis on the problems and solutions of mobile health APP *Economist*(01), 229-230.

Yoon, C., Hwang, J.-W., & Kim, R. (2012). Exploring factors that influence students' behaviors in information security. *Journal of information systems education, 23*(4), 407-416.

Yu, Zhong, Q., Wang, Q., Zhao, Y., & Feng, K. (2020). The application progress of mobile medicine in the continuous nursing of maintenance hemodialysis patients. *Chinese Nursing Research, 34*(18), 3268-3271.

Zhang, L., & McDowell, W. C. (2009). Am I really at risk? Determinants of online users' intentions to use strong passwords. *Journal of Internet Commerce, 8*(3-4), 180-197.

Zhu, Liu, H., Chen, Q., & Du, X. (2018). Research on Privacy Accountability in the Context of Mobile Medical Services——Based on the Perspective of Evolutionary Game. *Journal of Modern Information, 38*(12), 32-39.

Zhu, D., & Guo, J. (2016). Mobile government adoption model and empirical analysis based on UTAUT model. *Information Science, 34*(09), 110-114.