

**FACTORS INFLUENCING THE INTENTION TO
USE MOBILE HEALTH IN SMALL CITIES IN
CHINA**

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2023

**FACTORS INFLUENCING THE INTENTION TO
USE MOBILE HEALTH IN SMALL CITIES IN
CHINA**

by

ZHU FEI

**Thesis submitted in fulfilment of the requirements
for the degree of
Master of Arts**

September 2023

ACKNOWLEDGEMENT

Two years of my master's degree studies are coming to an end. As I complete my master's degree, I would like to express my gratitude to everyone who has helped me along the way.

First, I would like to express my deepest gratitude to my supervisor, Dr. Normalini Md Kassim, and Dr. Wan Normila Mohamad, for their rigor and patience in teaching me, for the helpful advice and specific direction they provided during my research, and for their dedication in writing and reviewing my thesis. I could not have successfully completed my dissertation without their assistance.

Second, I'd like to thank all the experts for their guidance and advice during the dissertation's review phase. The development of my dissertation was greatly aided by your professional and insightful feedback. I would also like to express my appreciation to everyone in the Postgraduate Office of the School of Management for their assistance.

Lastly, I'd like to thank my family, my parents for their understanding and assistance, my wife for her support, which is my strongest motivation and support, and my son. I love you all.

Finally, once more, I would like to thank everyone who assisted and supported me.

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LIST OF ABBREVIATIONS

mHealth	Mobile Health
HIMSS	The Healthcare Information and Management Systems Society
APP	Application
TRA	Theory of Rational Action
TPB	Theory of Planned Behavior
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Technology Acceptance and Use Technology
IDT	Innovation Diffusion Theory
TFT	Test/Technology Fit
PBC	Perceived Behavioral Control
SCT	Social Cognitive Theory
HBM	Health Belief Model
PMT	Protective Motivation Theory
SEM	Structural Equation Modeling
EM	Expectation Maximization
CMV	Common Method Variance
AVE	Squared Difference Extraction
HTMT	Heterogeneity Single Trait Ratio
CR	Composite Reliability
VIF	Variance Inflation Factor

LIST OF APPENDICES

- Appendix A Cover Letter and English Questionnaire Version
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**FAKTOR-FAKTOR YANG MEMPENGARUHI NIAT UNTUK
MENGUNAKAN PERKHIDMATAN KESIHATAN MUDAH ALIH DI
BANDAR KECIL DI CHINA**

ABSTRAK

Di sebalik kemajuan pantas kesihatan mudah alih di China akhir-akhir ini, penggunaannya masih terhad di bandar-bandar kecil. Penyelidikan sebelum ini kebanyakannya tertumpu pada bandar-bandar besar, dengan perhatian minimum diberikan kepada konteks bandar kecil di China. Oleh itu, kajian ini bertujuan membangunkan rangka kerja konseptual yang komprehensif merangkumi atribut teknologi, ciri individu, dan elemen kontekstual masyarakat. Matlamatnya adalah untuk menjelaskan penentu utama yang memberi kesan kepada niat pengguna untuk menerima pakai perkhidmatan kesihatan mudah alih di bandar-bandar kecil di China. Pengumpulan data kajian daripada 319 pengguna berpotensi melalui platform Cradmo dan di analisa menggunakan PLS-SEM bagi mengesahkan kedua-dua model dan hipotesis. Penemuan kajian menunjukkan bahawa niat penggunaan kesihatan mudah alih di kalangan pengguna di bandar-bandar kecil di China adalah ketara dan positif dipengaruhi oleh sikap mereka dari segi sifat peribadi. Selain itu, pengaruh sosial dan situasi kemudahan dalam konteks sosial, termasuk jangkaan prestasi daripada atribut teknologi, memainkan peranan penting. Faktor sikap secara ketara dan positif dipengaruhi oleh kesulitan dan kelemahan yang dialami. Selain itu, sikap celik eHealth memainkan peranan penyederhanaan positif dalam hubungan antara jangkaan prestasi dan niat penggunaan. Hasil kajian ini menyumbang kepada kemajuan teori untuk penyelidikan masa hadapan. Selain itu, hasil kajian juga memberi cadangan yang

berkaitan kepada pihak berkepentingan yang terlibat dalam perkhidmatan kesihatan mudah alih.

FACTORS INFLUENCING THE INTENTION TO USE MOBILE HEALTH IN SMALL CITIES IN CHINA

ABSTRACT

In spite of the swift advancement of mobile health in China lately, its adoption remains limited in small cities. Prior research predominantly cantered on large cities, with minimal attention given to small city contexts within China. Hence, this study seeks to develop a comprehensive conceptual framework encompassing technological attributes, individual traits, and societal contextual elements. Its goal is to elucidate key determinants impacting users' intent to adopt mobile health services within China's small cities. This study gathered data from 319 potential users via the Cradmo platform and employed PLS-SEM to authenticate both the model and hypotheses. The findings indicate that the intention of mobile health usage among users in China's small cities is positively and substantially affected by their attitudes in terms of personal traits. Additionally, social influence and facilitating conditions within the social context, along with performance expectancy associated with technological attributes, play vital roles. The attitude factor was notably and positively impacted by perceived severity and perceived vulnerability. Moreover, eHealth literacy played a positive moderating role in the connection between performance expectancy and usage intention. This study's outcomes contribute to theoretical advancements for future research endeavors. Additionally, the results offer pertinent suggestions to stakeholders involved in mobile health services.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter describes the current development of mobile health in China and elaborates on the research problem, followed by the corresponding research questions and research objectives. It also describes the theoretical contributions and practical implications of the study. Finally, this chapter presents the definitions of the structure and key terms used, as well as the structure of this thesis.

1.2 Research Background

National health is the most urgent of the many challenges faced at the national level, and achieving the goal of national health requires addressing challenges from multiple sources and consuming massive resources (Agarwal et al., 2010). China is undergoing economic development and social construction transition, which places higher demands on health care and brings new opportunities. Although China's population accounts for 22% of the world's total population, its healthcare resources account for less than 2%, and 80% of healthcare resources are concentrated in cities, especially those that are large or economically developed (Tian & Wu, 2022). In the meantime, the demographic structure of China's society has accelerated the aging process, and it is anticipated that by 2030, China will be the country with the most severe aging (Guo et al., 2023). The growth of the aging population has led to an increase in healthcare demands and the incidence of chronic diseases, and nearly 50% of future healthcare resources will be allocated to the elderly population (Hang & Pang, 2011). Furthermore, this change poses a considerable challenge to allocating limited healthcare resources. The further development of China's healthcare system is constrained by the profound contradiction

between the growing demand for healthcare and the shortage of healthcare resources, as well as the uneven distribution of healthcare resources (Zhang et al., 2022).

In recent decades, the rapid development of the graded diagnosis and treatment system (GDTS) in China has partially resolved this contradiction (Xiao et al., 2022). Nevertheless, at the present stage, China still faces an uneven distribution of medical resources, an overall shortage of medical services, and an imbalance in demand and supply between different provinces and cities (Ye et al., 2019). How to effectively address the inequitable distribution of healthcare resources has become a global concern (Liang et al., 2018). How to rationalize the allocation of medical resources and improve health equity was also one of the first issues to be resolved in China's health sector, and it is of great social significance (Zhang et al., 2022).

The emergence and development of mobile health (mHealth) are expected to break through the limitations of traditional medical care, thus alleviating the structural imbalance of medical resources to a certain extent and thus promoting the efficient use of medical and health resources (Karahanna et al., 1999; Tian & Wu, 2022; Zhu et al., 2023). Compared with traditional medical services, mobile health achieves instant access to medical resources, instant transmission of clinical data, and instant communication between doctors and patients, thus improving the operational efficiency of the medical system, optimizing the allocation of medical resources, improving the doctor-patient relationship, increasing patient satisfaction, and realizing the interaction of medical information anytime and anywhere, regardless of time and geographic restrictions (Ren et al., 2021).

Mobile health is defined by the Healthcare Information and Management Systems Society (HIMSS) as applications that provide healthcare services and medical

information via mobile communication technologies such as patient monitoring devices, personal digital devices, cell phones, and satellite communication. In the field of mobile communications, the application is based on mobile terminal systems for healthcare-type applications and connected medical devices and sensors as the main components (Nisha et al., 2015). Consequently, mobile communication technology and mobile terminals are the fundamental building blocks for mobile health's dramatic growth. The explosive growth of mobile terminal users in China over the past several years has paved the way for the rapid expansion of mobile health. According to the data of the 48th Statistical Report on the Development of the Internet in China, there were 1.07 billion cell phone users in China as of June 2021, and 99.6 percent of Internet users accessed the web through use of their cell phones. With the continuous development and maturity of mobile Internet technology, smartphones have become essential for the public to obtain information, communicate, and enjoy life. Mobile health is receiving widespread attention and favour from all walks of life as a brand-new service. The user scale of China's mobile health industry was 150 million in 2015, and the user scale grew to reach 710 million by 2021. It is expected that the user scale of China's mobile health industry is expected to exceed 800 million people in 2023. With the introduction of medical policies and the continuous expansion of the industry scale, the mobile medical industry chain has been gradually improved. 2015 China's mobile medical industry market size of 4.55 billion yuan, the market size grew to 72.22 billion yuan in 2021, with a compound annual growth rate of 58.53%, and is expected to exceed 150 billion yuan in 2023, Refer to figures 1.1 and 1.2 for details.

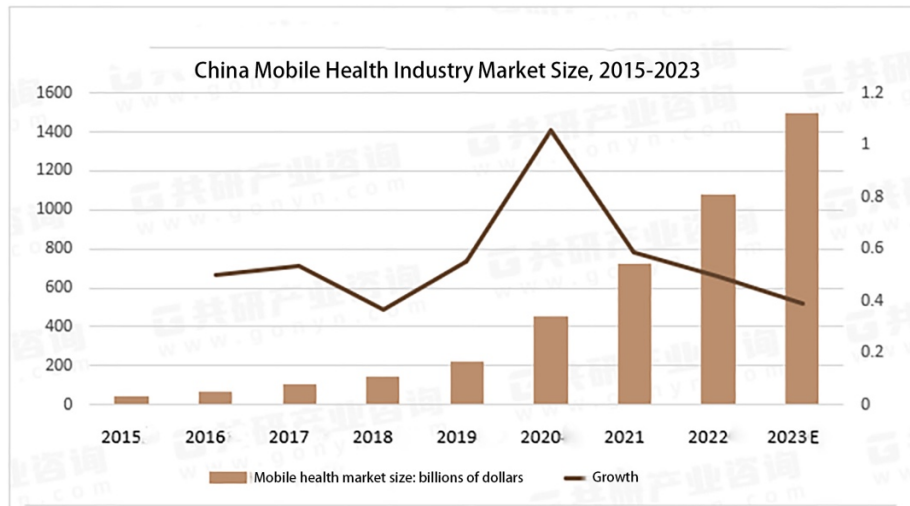


Figure 1.1 2015-2023 China Mobile Health Market Size

Source: Analysis of China's Mobile Health Industry Development History, Market Size, User Size and Key Direction of Industry Development in 2023 (2023)

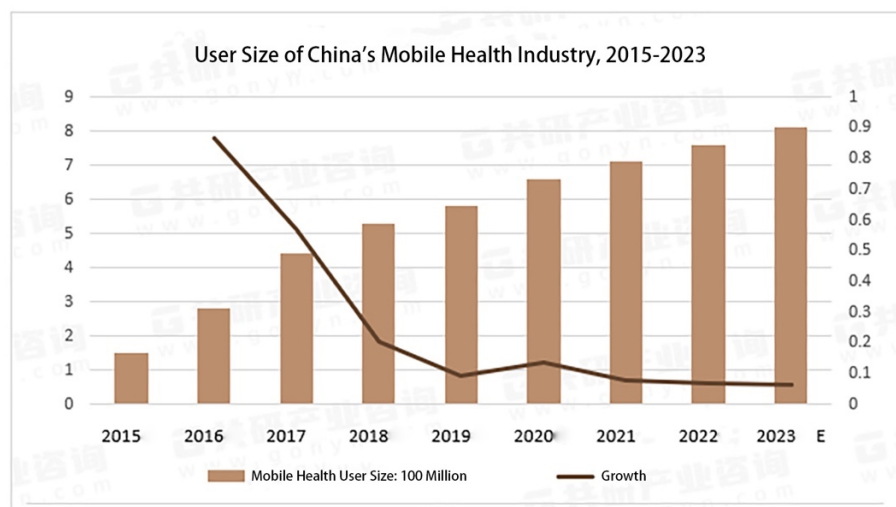


Figure 1.2 2015-2023 China Mobile Health Industry User Size

Source: Analysis of China's Mobile Health Industry Development History, Market Size, User Size and Key Direction of Industry Development in 2023 (2023)

The year-on-year growth of mobile social users and the mobile medical market in China provide favourable support for mobile medical services to improve the health of the nation and meet the increasingly diverse medical needs of people. Meanwhile,

the Chinese government is further promoting the implementation of policies related to mobile health (Ye et al., 2019). From refining the price of Internet medical services and medical insurance payment policies to clarifying the scope of medical insurance reimbursement for Internet consultations for patients with common and chronic diseases, from the online sale of drugs to the realization of the first consultation of Internet core medical treatment, government departments at all levels have actively supported the comprehensive development of mobile health by introducing corresponding policies, building a solid foundation for the growth of mobile medical user scale (Cao & Guo, 2022). Meanwhile, the accelerated construction of the Internet of Things and 5G networks has accelerated the development of remote surgery and telemedicine, and hospitals can work collaboratively at multiple ends through a shared platform for mobile health, which will help solve medical problems that were previously difficult to accomplish in remote and relatively poor medical resources (Wang & Zhang, 2020) . This will have a disruptive effect on China's medical big data industry chain and provide sustainability for mobile health (Hsu et al., 2016).

Due to the impact of "COVID 19" in 2021, China's mobile health requirements will expand. From laboratory to clinical frontline, from pathogen detection, epidemic tracing, and rapid screening to vaccine research and development, from online consultation telemedicine to Internet hospital, mobile health is breaking time, space, and geographic boundaries and is continuing to drive the growth of digital healthcare in China (Tao et al., 2023).

The combination of favorable policies, market demand, and technology, along with the increasing traffic of medical platforms, is ushering in a new phase of development for the industry. According to China Mobile Health Market Research Report, H1 2021 (2021), more than 1,000 companies are engaged in the mobile health

industry in China, with more than 13,000 patents and more than 2,000 mobile health APPs, which mainly provide online medical consultation, health management, pharmaceutical services and registration and guidance services. Online medical consultation services account for the highest proportion among these conventional services, accounting for 43%; registration and guidance accounts for 31%; pharmaceutical services account for 15%; health management accounts for 8%. For details, see Figure 1.4 and Figure 1.5.

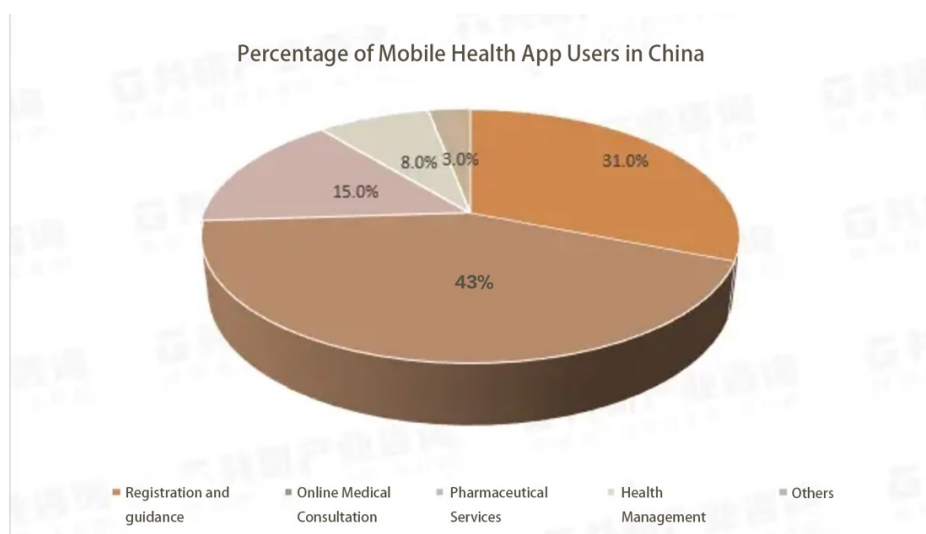


Figure 1.3 Cumulative User Share of Each Segment of Mobile Health in China in 2022

Source: China Mobile Health App Industry Chain Status and Pattern Trend of 2022 (2023)

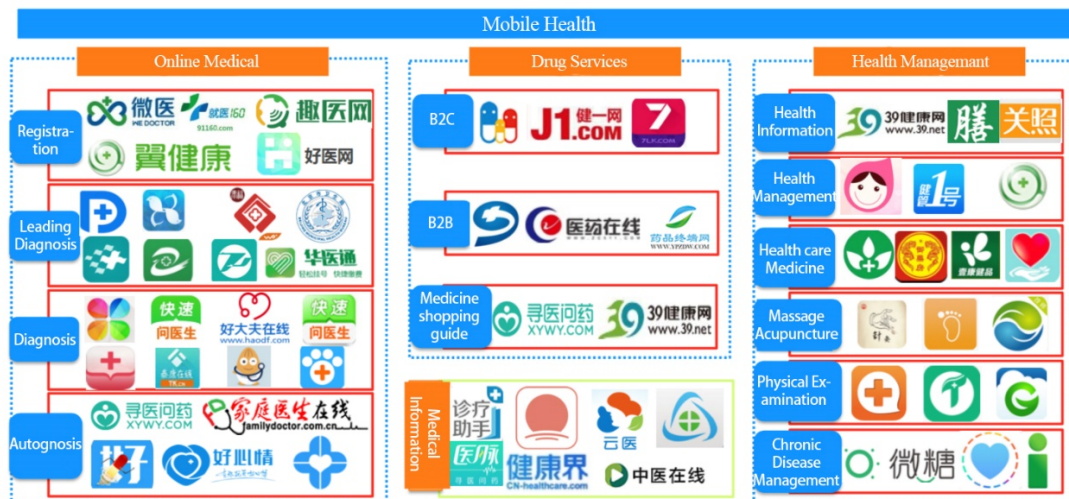


Figure 1.4 Mainstream APPs of Mobile Health in China in 2021

Source: China Mobile Health Market Research Report, H1 2021 (2021)

The rapid development of information and communication technology (ICT) has made all types of health management and health behavior interventions possible. In the past decade, the development, evaluation, and dissemination of computer-based health behavior interventions have expanded rapidly (Riley et al., 2011). From standard, stand-alone software to scalable, interactive and personalized web-based programs that are proven health interventions (Hibbard & Greene, 2013; Webb et al., 2010). Mobile technology can be an effective medium for transferring health care to individuals (Cornford et al., 2013). Mobile wireless technology revolutionized the relationship between the public and the national health service (Steinhubl et al., 2013). Mobile health are the next generation revolution and evolution of computer-based health interventions (Riley et al., 2011). Mobile medical services can improve the treatment and coverage of medical care, improve access to medical information, services and skills, while mobile medical services promote the transformation of the traditional chronic disease management model. With the help of mobile medical chronic disease patients can monitor changes in blood pressure and blood glucose through intelligent electronic

devices and can also consult their doctors anytime and anywhere. Meanwhile, healthcare professionals can easily and quickly obtain accurate information about patients' conditions and use mobile medical devices to monitor and efficiently manage their daily conditions (Cornford et al., 2013). In addition, mobile health can also provide patients with medical knowledge and promote good health habits, which can have a positive effect on the recovery of chronic diseases and effectively reduce the occurrence of complications and increase the cure rate, optimizing the use of medical resources (Silva et al., 2015). Investigating the usage patterns of mobile health not only contributes to the advancement of IT, but also has substantial implications for the healthcare industry (Susan & Craig, 2008).

The World Health Organization (WHO) has acknowledged mobile health as an efficient method of health management (Consulting, 2014). In addition, mobile health successfully integrate wireless technologies into the medical industry, contribute to the reduction of medical costs, the balancing of healthcare resources, the enhancement of medical standards, and the facilitation of patient access to medical services (Akter et al., 2013). However, as an innovative new model of medical information service in China, mobile health have not been widely adopted and utilized, particularly in small cities and rural areas with limited medical resources (Dai et al., 2020; Meng et al., 2021; Nie & Zhang, 2021; Ning, 2020; Zhao et al., 2020).

According to China Mobile Health Products Market Monitoring Report, Q1, 2021 (Short Version) (2021), first-tier cities accounted for 29.5% of the regional distribution of users in China's mobile health market in the first quarter of 2021; new first-tier cities accounted for the highest share at 38.6%; second-tier cities accounted for 19.7%. However, the third-tier cities accounted for 8.4% of the total, while the fourth-tier cities and below accounted for only 3.8%. In the distribution of specific cities, large

cities such as Beijing, Shanghai, Guangzhou, Chengdu, and others comprise the top 10 cities in terms of mobile health users. Refer Figure 1.6 and Figure 1.7 for details. In small cities with limited medical resources and a high proportion of urban residents, mobile health should play a more significant role, but the opposite is true.

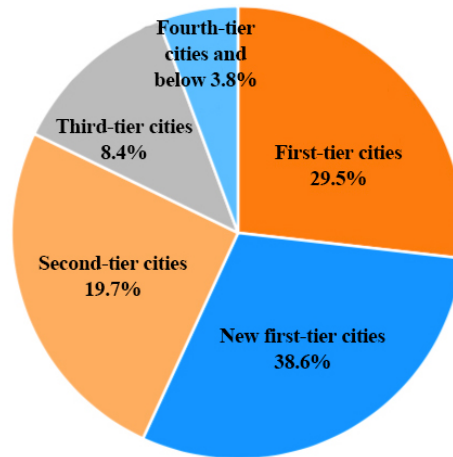


Figure 1.5 Regional Distribution of Mobile Health Users in China in the First Quarter of 2021

Source: China Mobile Health Products Market Monitoring Report, Q1, 2021 (Short Version) (2021)

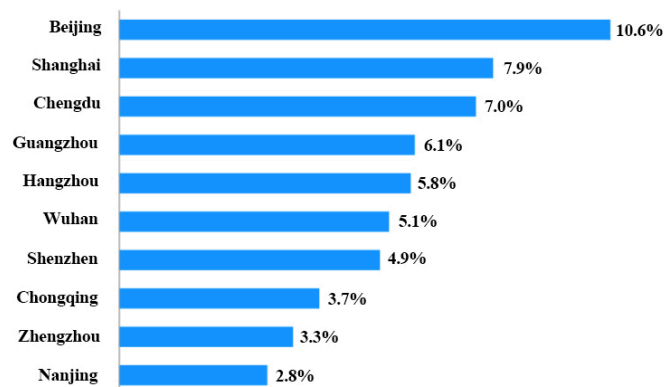


Figure 1.6 Top 10 Cities of Mobile Health Users in China in the First Quarter of 2021

Source: China Mobile Health Products Market Monitoring Report, Q1, 2021 (Short Version) (2021)

1.3 Research Problem

Although mobile health has been widely recognized for its superiority, the scope of its application has not yet reached expectations (Huang et al., 2022). Because the anticipated benefits of IT must be adopted and accepted before they can be realized, user adoption and acceptance are prerequisites for the realization of these benefits (Bhattacharjee & Sanford, 2006). Exploring user behavior in mobile health is critical for its future widespread use and development. There have been many studies on mobile health application and service design and influencing factors (Bawack & Jean, 2018; Breil et al., 2019; Dai et al., 2017; Dwivedi et al., 2016; Hsieh et al., 2016; Li et al., 2020; Ramdani et al., 2020). Still, most of these studies have focused on a specific domain or discipline (specific population groups and specific diseases), needing a comprehensive and in-depth exploration from a holistic perspective (Luo et al., 2021). In addition, the discussion of the factors influencing the mobile health adoption behavior of users is insufficiently exhaustive (Liu et al., 2005). Mobile health has a significant impact on people's daily lives. People, technology, and organization are essential components of information systems, implying that human characteristics, technology, and organization are interdependent and mutually influencing. The adoption and impact of mobile health will only improve if humans, technology, and the organization are well-matched (Kukafka et al., 2003; Shaw, 2002; Yusof et al., 2008). Nevertheless, the vast majority of prior researches have tended to disregard the interaction and interdependence between human characteristics, technology, and social context, resulting in research findings that frequently have little impact on healthcare practice (Cimperman et al., 2016). Therefore, a comprehensive and holistic approach is necessary, where "holistic" refers to an emphasis on the importance of the approach as

a whole and the interdependence of its parts, avoiding separate analyses of parts or the absence of one part of the approach.

Existing research findings on mobile health usage intentions and their influencing factors focus on the mobile health technology itself, only considering mobile health services as an innovative technology and explaining users' usage intentions from the perspective of technology acceptance, while ignoring the impact of the technology as a new healthcare service model on users' usage intentions. Nutbeam (1998) defines the health behavior as “any activity undertaken by an individual to promote, protect or maintain health, regardless of actual or perceived health status, regardless of whether such behavior is objectively effective.” However, The mobile health adoption behavior is identified as a response to possible health threats (Laugesen & Hassanein, 2011) or the intention to avoid health risks and maintain security may inspire users' adoption of mobile health technology (Milne et al., 2000). Therefore, the activity of mobile health use is also recognized as a health behaviour (Scammon et al., 2011). In order to investigate in depth the behavioural intention of users of mobile health services technology, researchers should combine the perspectives of technology acceptance and health behaviors to distinguish them from other technologies (Holden & Karsh, 2010).

In addition to establishing a holistic theoretical framework, the influence of social contextual factors on the model needs to be studied in depth to understand its intrinsic mechanisms better. By reviewing and sorting through the existing literature, this study found that there are still relatively few research results on mobile health usage intention and its dimensions in China. Most of the previous studies on mobile health have focused on first-tier cities or large, economically developed cities in China, while

few studies have addressed the factors that influence the intention to use mobile health in small cities in China. As a new healthcare model with IT features, mobile health requires a certain level of eHealth literacy among users to proficiently use online resources to access adequate e-health information and solve related health problems. Differences in eHealth literacy due to the digital divide evident at the prefecture level in China have resulted in different levels of ICT adoption across cities (Song et al., 2019; D. Wang et al., 2021). Therefore, the findings of previous studies are not feasible for direct replication in small cities in China (Hong & Zhou, 2018; Latulippe et al., 2017).

Consequently, this study aims to integrate technology acceptance theory and health behavior theory based on the features of mobile health technology as well as the personal characteristics and social context of potential users in small cities in China and to construct an extended theoretical model that integrates factors such as technology, personal and social context. From a holistic standpoint, the multiple factors that influence users' behavioral intention to use mobile health services in small cities in China and the complexity of the interactions among these factors are explored in depth.

1.4 Research Questions

This study will develop a holistic framework of technological, personal, and social contextual factors to investigate the influence of intention to use mobile health in small city users in China. In addition, this study will investigate the influence of eHealth literacy on the moderating effects of technological, human, and social contextual factors.

Therefore, this study aims to:

1. How do the technological features of mobile health influence users' intentions to use mobile health in small cities in China?
2. How do social context factors influence users' intentions to use mobile health in

small cities in China?

3. How do personal characteristics in small cities in China influence the intention to use mobile health?
4. How does eHealth literacy moderate the relationship between mobile health use intentions and technical features, social context, and personal characteristics?

1.4. Research Objectives

Based on the research objectives, the following research questions are defined:

1. To investigate the influence of mobile health technology features on users' intention to use mobile health in small cities in China.
2. To investigate the social contextual factors that influence users' intention to use mobile health in small cities in China.
3. To investigate the impact of personal characteristics of users on intention to use mobile health in small cities in China.
4. To investigate the moderating effect of eHealth literacy on the relationship between technological features, social context, personal characteristics factors and intention to use mobile health.

1.5 Scope of the Study

There are numerous parties involved in mobile health, including patients, ordinary users with health management or prevention needs, and medical personnel. The focus of this investigation is the mobile health adoption behavior of ordinary users. In addition, the aim of this study is to investigate the adoption behavior of mobile health in China's small cities in the context of the current medical environment.

Currently, mobile health is utilized for patient communication, monitoring, and education, clinical diagnosis, service enhancement, treatment adherence enhancement,

and chronic disease management. Patients are provided with health management services and related information via short messages, video, voice, image delivery, and mobile health applications. mobile health is defined by HIMSS as the delivery of health information services and data via advanced mobile communication and Internet technologies, primarily mobile health applications. Therefore, this study focuses on the study of usage intention of mobile health Apps.

1.6 Significance of the Study

This study will provide a theoretical contribution to the explanatory power of technology acceptance theory in specific contexts and provide practical recommendations for stakeholders involved in promoting mobile health development in small cities in China.

1.6.1 Theoretical Contribution

In examining mobile health usage behavior, it is often viewed only as an innovative technology, ignoring the impact of mobile health as a health behavior on behavioral intentions and the interdependence between people, technology, and organizations, which results in these theoretical models failing to provide a complete core theoretical framework to holistically explain mobile health usage intentions. Therefore, focusing on small cities in China, this study integrates technology acceptance theory and health behavior theory to develop a holistic model that incorporates technological, personal, and social contextual features to investigate the significant influences that affect mobile health usage intentions of users in small cities in China. While this study is an extension of technology acceptance theory to a health behavior perspective, this study will also validate the explanatory power of technology acceptance theory in resource-constrained contexts. Therefore, this study will address the specific limitations of classical

technology acceptance theory and test the explanatory power of technology acceptance theory in specific contexts from an innovative perspective.

1.6.2 Practical Implications

Mobile health can reduce medical expenses, enhance diagnosis and treatment efficacy, and equitably distribute medical resources. In China's small cities, however, the habits of users have not yet developed. The advantages of mobile health have not been fully demonstrated due to their low level of mobile health awareness and utilization. This study empirically examines the major influencing factors on the adoption of mobile health in China's small cities: mobile health technology features, personal characteristics, and social background. To increase product usage and market share, mobile medical service providers can develop, and design products based on the technical characteristics of mobile medical services and emphasize the technical characteristics that have a significant impact on user intent. By promoting and publicizing the benefits of mobile health, government administrators can increase the influence of social contextual factors on intention to use mobile health. For end users, the influence of personal characteristics on intention to use mobile health and the moderating effect of eHealth literacy can enable them to better use mobile health-related products and eliminate health threats to promote their own health. This study ultimately provides theoretical support and empirical data to improve the intention to use mobile health in China's small cities, thereby increasing the adoption rate of mobile health in small cities, promoting the full social value of mobile health, enhancing national physical fitness, and enhancing public health literacy.

1.7 Definition of the Constructs and Key Terms Used

The definition of the key terms used in this study are stated below:

Mobile Health - Mobile health is defined by the Healthcare Information and Management Systems Society (HIMSS) as applications that provide healthcare services and medical information via mobile communication technologies such as patient monitoring devices, personal digital devices, cell phones, and satellite communication (Nisha et al., 2015).

The Health Behavior - Any activity undertaken by an individual to promote, protect or maintain health, regardless of actual or perceived health status, regardless of whether such behavior is objectively effective (Nutbeam, 1998).

The Small Cities of China - The small cities in this study are defined as the 4th and 5th tier cities in the China City Business Attractiveness Rankings published by the China New First-Tier Cities Institute in 2021 (Institute, 2021).

Performance expectancy (PE) - Performance expectancy (PE) is the degree to which a system enhances the user's work performance when the user uses it (Venkatesh et al., 2003).

Effort expectation (EE) - Effort expectation (EE) is the effort that users perceive as the ease of using a certain system (Venkatesh et al., 2003).

Social influence (SI) - Social influence (SI) is the importance of the user's perception of what other people consider to be their opinion of the use of the new system (Venkatesh et al., 2003).

Facilitation conditions (FC) - Facilitation conditions (FC) is the degree to which an individual believes that the necessary organizational and technical infrastructure exists to support the system's use (Venkatesh et al., 2003).

Perceived severity (PS) - Perceived severity (PS) primarily refers to an individual's estimation of the degree to which a behavior endangers one's physical and mental health (Maddux & Rogers, 1983).

Perceived vulnerability (PV) - Perceived vulnerability (PV) primarily refers to the core belief formed after an individual's subjective evaluation of the likelihood of contracting a particular disease (Maddux & Rogers, 1983).

Perceived ubiquity (PQ) - Perceived ubiquity as the degree to which users have access to healthcare services via mobile devices at any time and in any location.

Attitude – Attitude refers to the attitude of consumers towards mobile health, i.e., positive or negative evaluations (Holden & Karsh, 2010).

eHealth literacy - eHealth literacy is the ability to use electronic channels to search for, locate, and evaluate health information and to address health problems (Norman & Skinner, 2006).

1.8 Structure of the Thesis

The following is the remaining part of this study. In Chapter 2, the definition and characteristics of mobile health are reviewed, and the literature on technology acceptance theory and health behavior theory in the context of mobile health is highlighted, leading to the construction of an extended model and the formulation of related hypotheses. In Chapter 3, a summary of the research methodology is presented, whereas in Chapter 4, the collected data are analyzed in detail using the data analysis techniques described in Chapter 3. In Chapter 5, the findings of the research are discussed in detail, and pertinent research questions are answered as a means of

summarizing and discussing the limitations of the study, as well as exploring the directions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the concept of mobile health is first clarified, and its characteristics and service classification are summarized and summarized. Secondly, by combing through previous literature on mobile health usage behaviour, this chapter delves into the theoretical basis of mobile health usage intention, conceptualizes and analyses the influencing factors of various mobile health service usage intentions, and proposes research hypotheses, finally constructing a theoretical framework.

2.1.1 Concept of Mobile Health

Mobile health is an emerging concept in medical and health care, and it is also a hot spot in the entire mobile communication field. WHO (2011b) defines mobile health as the support of healthcare and public health via mobile devices like mobile phones, hospital monitoring equipment, personal digital assistants (PDAs), and other wireless devices. The National Health Commission of China has extended the definition of mobile health to the whole process of comprehensively monitoring, analysing, and evaluating the health status of individuals or groups by using mobile technology, providing health consultation and guidance, and intervening in health risk factors that is, and it includes not an only simple diagnosis, treatment and rehabilitation functions, but also psychological counselling, diet guidance, exercise guidance, medication guidance Self-monitoring and other health management functions (Yang et al., 2015). Table 2.1 lists the more representative definitions of mobile health.

Table 2.1 The More Representative Definitions of Mobile Health

The Definitions	Source
Mobile health refers to the utilization of mobile phones in healthcare services to improve individuals' health.	Farhady et al. (2020)
Mobile health refers to the services and applications that facilitate the delivery of health care, prevention, diagnosis, treatment, and monitoring via mobile devices.	Deng et al. (2014)
Mobile health is the application of mobile computing and communication technologies to health care and public health.	Nisha et al. (2016)
Mobile health refers to personal and interactive services that provide ubiquitous and real-time medical advice and information to any user at any time through the mobile platform.	Motamarri et al. (2014)
Mobile health is the use of mobile health applications and connected wearable devices for the purpose of health promotion and protection.	Sari et al. (2019)

Based on the research content and the type of services focused on in this study, this study defines mobile health as relying on mobile communication technology and intelligent terminal equipment and effectively linking users, service platforms, medical staff, medical institutions, pharmaceutical companies, government departments and other subjects, to realize real-time, professional and efficient interactive medical and health services online and offline, such as data information, diagnosis and treatment behavior and health management. It can assist users in obtaining a full spectrum of full-cycle medical and health services at a lower cost, assist physicians in maximizing their value, and improves the performance and effectiveness of medical services. Mobile health plays an essential role in optimizing and allocating medical service resources, accumulating and applying massive amounts of medical data, improving public health literacy, and promoting and implementing the system of graded diagnosis and treatment and family doctors.

2.1.2 The Characteristics of Mobile Health

Mobile health are advanced IT services for medical, health promotion, and public health purposes (Lupton, 2014) and have revolutionized traditional health management by making healthcare more affordable and accessible (Sundaram et al., 2007). Mobile health are known to reduce medical costs, improve usability, and offer personalized services (Akter & Ray, 2010). Its services encompass mobile phones, tablets, wearables, PDAs, hospital monitoring equipment, and additional wireless devices (Nisha et al., 2015; WHO, 2011a). Using these mobile devices, doctors and other medical professionals can monitor patient vitals in real time, collect healthcare information, and perform mobile telemedicine (Yadav et al., 2016). Mobile health can play various roles depending on the patient's specific situation, demands, and availability of healthcare services, including providing essential medical information anytime, anywhere, for example, Ping An Health App. Providing remote and extended care, such as Dnurse App (blood glucose management tool). Accessing health care anytime, anywhere through mobile devices professionals, integration and real-time delivery of decision-making information to healthcare professionals, such as the Ding Xiang Doctor App. Providing mobile medical nursing solutions, such as the MedicloudSuite mobile medical examination system. People in areas with limited access to medical care (such as rural areas) can receive medical care through mobile health, particularly in developing nations. Nonetheless, mobile health can also enable individuals in urban areas and developed nations to access health care services without regard to physical location (Varshney, 2014). On the other hand, mobile health has revolutionary significance in developing countries lacking medical resource bases. Hence, they play an essential role in health interventions (Chan & Kaufman, 2010; Han et al., 2021), the

prevention of infectious diseases (Singh et al., 2020; Walton & DeRenzi, 2009), and improving health literacy (Mackert et al., 2009).

Accessibility, personalization, timeliness, positioning function, interactivity, and mobility as a new medical model (Gong et al., 2020; Liang et al., 2018; Meng et al., 2021) are some of the ways in which mobile health service is superior to the traditional medical care.

(1) Accessibility

Traditional medical services necessitate that patient travel to the hospital for face-to-face consultations with doctors in order to receive the necessary medical care. By utilizing mobile health, patients can save time traveling to the hospital and receive medical care from mobile devices at any time. Mobile health can be provided to anyone at any time, regardless of time, location, or other constraints, and they can increase service coverage and deliver high-quality medical care. Through mobile health devices, users can obtain global, dependable, and efficient medical services and biomedical information at any time, as well as quickly communicate with medical staff. Mobile health can accommodate various user medical requirements, including disease prevention, short- and long-term monitoring, accident detection, and emergency intervention (Varshney, 2005).

(2) Personalization

Personalization can facilitate the development of close relationships with users and the expansion of service content. Personalization of mobile health refers to the delivery of appropriate medical services via mobile devices for the specific physical conditions and illnesses of individual users (Guo et al., 2016). Users can obtain mobile

health based on their age, gender, medical needs, physical health, illness, personal preferences, and other aspects of the services and products they require. In actuality, personalized services are derived from patients' health information (Pappas et al., 2012). Therefore, the more relevant health information is obtained, the more accurate the service will be, and it will better meet users' needs.

(3) Timeliness

Mobile health can provide relevant, accurate and purposeful information in time (Barnes & Scornavacca, 2004). Mobile wireless devices can detect one or more critical signals and transmit early warning information to hospitals, ambulance centres, and medical professionals to help them prepare for emergency treatment. Therefore, mobile health devices can detect medical emergencies in a timely and accurate manner and provide more effective medical services and information. Most importantly, medical professionals can provide patients with timely, appropriate care and enhance treatment efficacy.

(4) Positioning Function

Using a global positioning system, cellular data, WLAN (Wireless Local Area Network), and RFID (Radio Frequency Identification) technology, mobile health provide information services pertaining to specific situations. Medical applications for mobile health can assist users in locating and monitoring patients, physicians, mobile devices, and service providers. The positioning function of mobile health is advantageous for some users in emergency situations and very useful for locating individuals with blood group compatibility, organ donors, the elderly, or those with intellectual disabilities (Varshney, 2005).

(5) Interactivity

Interactivity refers to the interaction between service providers and users through the mobile platform (Dagger et al., 2007). Mobile health service requires interaction between users and medical professionals. The interactive quality of mobile health consists of three essential components: response, assurance, and empathy. Response refers to the service provider's willingness to assist users and deliver services promptly (Akter et al., 2010); Assurance measures the knowledge and trustworthiness of the service provider (DeLone & McLean, 2003); Whilst, empathy reflects the care and personalized attention of the provided service to the user. It shows the service's understanding of the user's needs and the ability to provide personalized attention (Akter & Ray, 2010).

(6) Mobility

Mobility is a crucial factor affecting user satisfaction with the use of mobile technology (Gebauer & Shaw, 2004). Mobility refers to people's independence not bound by geographic location. Mobile health can exhibit three types of mobility, namely spatial, time mobility and situational mobility. Spatial mobility refers to the movement of people's geographic locations. Time mobility refers to the time sequence of work in an organizational context, reflecting both work rhythm and work time. In the medical context, timing affects the use of different technologies (Masao & Carsten, 2002). For instance, during medical emergencies medical, depending on the patient's condition, medical professionals must use different treatment methods at varying time intervals and in different treatment sequences. The scene's mobility refers to the situational nature of people's actions. People's behaviors are intrinsically positioned within a specific