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A Novel Extension of the UTAUT Model Incorporating Empathy to Explore Factors Influencing Doctors' Acceptance Intentions Towards Internet Hospitals in Guangdong Province, China

ZU Chenxi

Doctor of Management

Supervisor:

PhD Carlos Lopes Cruz, Invited Assistant Professor,
ISCTE University Institute of Lisbon

March, 2024



BUSINESS
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Marketing, Operations and General Management Department

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Abstract

In the face of the rapid development of Internet technology, Internet hospitals have emerged as an innovative medical service model, receiving exceptional momentum in Guangdong Province, China. This study aims to identify the key factors influencing doctors' acceptance of Internet hospitals in Guangdong Province, providing theoretical and practical guidance for promoting and optimizing these services. Based on the Unified Theory of Acceptance and Use of Technology (UTAUT), the study innovatively incorporates empathy as an influencing factor, establishing a theoretical framework to analyze doctors' intentions to use Internet hospitals.

Data were collected through a questionnaire survey conducted among doctors sampled from several hospitals in Guangdong Province. The research team designed the questionnaire to incorporate the UTAUT model's core variables and an empathy assessment scale. Quantitative analysis using structural equation modelling showed that performance expectancy, effort expectancy, and social influence significantly and positively affect doctors' acceptance intentions while facilitating conditions significantly impact doctors' behaviour using Internet hospitals. As an innovative variable in the model, empathy showed a significant positive effect. It indicates that doctors are more inclined to adopt Internet hospitals when they have better sensitivity and compassion towards patients.

This study not only expands the doctors' perspective on the acceptance of Internet hospitals but also broadens the application domain of the UTAUT model by introducing the dimension of empathy, demonstrating the study's innovation. For policymakers and managers of Internet hospitals, this study provides valuable elements for promoting technology acceptance by enhancing doctors' empathy and offering supporting data to formulate effective promotional strategies.

Keywords: Internet Hospital, Intention to use internet hospitals, UTAUT, empathy

JEL: I11, O33

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Resumo

Perante o rápido desenvolvimento da tecnologia da internet, os hospitais online surgiram como um modelo inovador de serviço médico, ganhando um especial impulso na Província de Guangdong, China. Este estudo visa identificar os fatores-chave que influenciam a vontade dos médicos na Província de Guangdong em aceitar hospitais online, fornecendo orientação teórica e prática para a promoção e otimização desses serviços. Com base na Teoria Unificada de Aceitação e Uso de Tecnologia (UTAUT), o estudo incorpora de uma forma inovadora a empatia como um fator de influência, estabelecendo um quadro teórico para analisar a vontade dos médicos em usar hospitais online.

Os dados foram coletados por meio de um questionário aplicado a médicos amostrados de vários hospitais na Província de Guangdong. O questionário foi desenhado para incluir os elementos centrais do modelo UTAUT e uma escala de avaliação para empatia. A análise quantitativa usando modelagem de equações estruturais revelou que a expectativa de desempenho, a expectativa de esforço e a influência social afetam significativamente de forma positiva a vontade de aceitar dos médicos, enquanto que as condições facilitadoras têm um impacto positivo significativo no comportamento de uso dos médicos em relação aos hospitais online. De salientar que a empatia, como uma variável inovadora no modelo, mostrou um efeito positivo significativo, indicando que os médicos estão mais inclinados a adotar hospitais online quando têm uma melhor sensibilidade e simpatia pelos pacientes.

Este estudo não apenas expande a compreensão da aceitação de hospitais online a partir da perspectiva dos médicos, mas também amplia o domínio de aplicação do modelo UTAUT ao introduzir a dimensão da empatia, demonstrando a inovação do estudo. Para os tomadores de decisões políticas e gestores de hospitais online, este estudo sugere elementos valiosos sobre como promover a aceitação da tecnologia ao aumentar a empatia dos médicos, oferecendo dados de suporte para a formulação de estratégias de promoção eficazes.

Palavras-chave: Hospital online, Intenção de usar hospitais online, UTAUT, empatia

JEL: I11, O33

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摘 要

面对互联网技术的快速发展，互联网医院作为一种创新的医疗服务模式，在中国广东省获得了特别的推动。本研究旨在识别影响广东省医生接受互联网医院的关键因素，为推广和优化这些服务提供理论和实践指导。研究基于整合技术接受模型（UTAUT），创新性地将同理心作为一个影响因素纳入，建立了一个理论框架来分析医生使用互联网医院的意愿。

通过对广东省多家医院的医生进行抽样，利用问卷调查法收集数据。问卷设计包括了UTAUT模型的核心变量和同理心评估量表。使用结构方程模型进行的定量分析显示，绩效期望、努力期望和社会影响显著正向影响医生的接受意愿，而促成因素对医生使用互联网医院的行为有显著正向影响。值得注意的是，作为模型中的一个创新变量，同理心显示出显著的正向效应，表明当医生对患者有更好的敏感性和同理心时，他们更倾向于采纳互联网医院。

本研究不仅从医生的视角扩展了对互联网医院接受度的理解，而且通过引入同理心维度，扩大了UTAUT模型的应用领域，展示了研究的创新性。对于政策制定者和互联网医院管理者，本研究提供了如何通过提高医生的同理心来促进技术接受的有价值的要素，为制定有效的推广策略提供了支持数据。

关键词：互联网医院，互联网医院使用意愿，UTAUT，同理心

JEL: I11, O33

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List of Abbreviations

AI	Artificial Intelligence
APPs	Applications
AVE	Average Variance Extracted
BI	Behavioural Intention
BTA	Behavioural Targeting Advertising
CB-SEM	Covariance-based SEM
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CIO	Chief Information Officer
CNKI	China National Knowledge Infrastructure
COVID-19	Coronavirus Disease 2019
CR	Composite Reliability
EE	Effort Expectancy
FC	Facilitating Conditions
IDT	Innovation Diffusion Theory
IFI	Incremental Fit Index
IH	Internet Hospitals
IoT	Internet of Things
MI	Modification Indices
MM	Motivational Model
MPCU	Model of PC Utilization
NFI	Normed Fit Index
NGO	Non-Governmental Organizations
PE	Performance Expectancy
PLS-SEM	Partial Least Squares Structural Equation Modeling
RMSEA	Root Mean Square Error of Approximation
RQ	Research Question

SCT	Social Cognitive Theory
SEM	Structural Equation Modeling
SI	Social Influence
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TLI	Tucker-Lewis Index
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UB	Usage Behaviour
UK	United Kingdom
US	United States
UTAUT	Unified Theory of Acceptance and Use of Technology

Chapter 1: Introduction

1.1 Research background

The Internet emerged as a public medium for information. Since the Advanced Research Projects Agency Network project of the 1960s, it has undergone over half a century of development, bringing about revolutionary changes across the globe. It has not only innovated how we access information but has also profoundly impacted the development of various industries and people's lifestyles. Since the 1990s, China has made significant progress in Internet infrastructure and applications and has become a major force in the global development of the Internet.

With the rapid development of Internet technology, China has entered a new era of digital transformation. The rise of the "Internet + industry" model has driven the deep integration of traditional industries with the Internet, giving birth to new business models and development opportunities.

For instance, "Internet + healthcare," as a representative example, has brought revolutionary changes to the Chinese medical industry. Internet Hospitals (IH), as one of its crucial components, leverage Internet technology to enable patients to receive online consultations and medical services anytime and anywhere. The availability of these services through IH has proven to be especially valuable during the COVID-19 pandemic, highlighting their significant importance. As a vital component of "Internet + healthcare," IH offer a service model that enables patients to access Internet-based medical consultations and treatments via Internet devices or applications (APPs). This model originated from the telemedicine approach but has developed its unique characteristics and path in China. IH utilizes online platforms to enable patients to consult with doctors and receive medical services online anytime and anywhere, breaking through time and space constraints. Especially during the COVID-19 pandemic, the application of IH played a significant role, offering a safe and efficient way for people to access medical care.

The performance and rapid development of China's internet-based medical consultations during the pandemic prevention and control efforts have been remarkable. As of June 2022, China has approved the establishment of over 1,700 IH, which fully demonstrates the

widespread application and importance attached to IH in the Chinese healthcare sector. Compared to traditional medical consultation models, IH offers higher accessibility and convenience, providing patients with more flexible and convenient healthcare options.

However, as a novel healthcare service model, IH also face specific challenges and issues. Firstly, the level of acceptance of IH needs to be further improved. Although many people widely used IH during the pandemic, some still harbor doubts and mistrust towards online medical consultations. Secondly, the operational model of IH requires further refinement. During the operation of IH, doctors' professionalism and patients' privacy and security are ensured. It is necessary to establish comprehensive regulatory mechanisms and security systems (W. R. Ma et al., 2021).

In conclusion, as a novel healthcare service model, IH possess tremendous potential and expansive developmental space within China's medical industry. By paying close attention to their level of acceptance and operational models, we can promote IH's healthy development and fully capitalize on their advantages in enhancing the accessibility and convenience of medical services, thereby providing better healthcare options for the public. At the same time, IH also needs to collaborate effectively with traditional medical institutions to jointly drive the development and progress of the healthcare sector.

1.1.1 The development and popularization of the Internet in China

In the mid to late 1980s, Chinese researchers and scholars began to explore the potential of the Internet, partly with the support of their foreign counterparts. On April 20th, 1994, a dedicated line connected the educational and research demonstration network in Beijing's Zhongguancun area to the international Internet. This full-function connection signified China's official integration into the global internet network and laid the foundation for subsequent technological innovations and social transformations (The State Council Information Office of the People's Republic of China, 2010).

The Internet's development in China has transformed from initial access to widespread adoption, overcoming spatial limitations, barriers to information exchange, and temporal constraints. With the advancement of the global fourth industrial revolution, China has achieved significant accomplishments in constructing Internet infrastructure and applying technology. According to data from the China Internet Network Information Center, as of June 2023, the number of Internet users in China reached 1.079 billion, with mobile internet users accounting for 1.076 billion. The scale of online medical service users has also seen significant growth, reaching 364.16 million, which constitutes 33.8% of the total Internet population (China

Internet Network Information Center, 2023).

The popularization of the Internet has not only met people's basic needs but has also fostered innovation and development in industries such as online education, electronic commerce, and social media. The widespread application of Internet technology has provided people with more opportunities for learning, communication, and business. It has simultaneously driven the rapid development of the digital economy, becoming a new engine for China's economic growth. With the continuous advancement of Internet technology, people's daily lives are becoming increasingly dependent on the Internet, whether in consumer spending, online education, or smart travel, where it plays a central role.

In the future, the development of the Internet in China will continue to deepen. New technologies such as artificial intelligence, big data, and the Internet of Things (IoT) will further integrate into daily applications, promoting the transformation and upgrading of various sectors of society, including the Healthcare industry. At the same time, China will continue to formulate and improve policies and regulations to ensure network security, promote the free flow of information, and protect users' privacy rights in support of the healthy and orderly development of the Internet.

1.1.2 The state of telemedicine in North American and European countries

In North American and European countries, the definition of telemedicine is quite broad. It includes communication and network technologies for patient consultations, health guidance, follow-ups, inter-institutional consultations and teaching activities among healthcare facilities. According to the World Health Organization, telemedicine involves using telecommunication and virtual technology to deliver healthcare services outside traditional health facilities (World Health Organization, 2016). The American Telemedicine Association defines it as exchanging medical information between different sites via electronic communications to improve a patient's clinical health status. Eisenstein et al. (2020) posit that telemedicine provides healthcare services at a distance using telecommunications and information technology. Their research also points out that the definition of telehealth is even broader, including the clinical services of telemedicine and encompassing nursing, educational research, and remote education aimed at disaster planning and primary healthcare in remote areas.

Based on the definition of telemedicine, literature indicates that the first instance of telemedicine occurred in 1879. Robblee (2023) notes in his study that one of the early cases of modern telemedicine took place in that year when a doctor diagnosed an infant's cough over the telephone to rule out whooping cough. Subsequently, in the 1950s, the United States (US)

began utilizing two-way television systems in radiology, signifying the development of early forms of telemedicine. Entering the early 1960s, the US provided services to astronauts in space through remote health monitoring systems. Concurrently, telemedicine services offer medical assistance to immigrant families in the US (Darrah, 1962). As time moved into the 1990s, telemedicine in the United Kingdom (UK) began to be applied and experienced rapid development over a decade (Debnath, 2004). By 2004, the UK had invested over 170 million pounds in research within the telemedicine healthcare field (Barlow & Hendy, 2009). In Portugal, health authorities in the Alentejo region started experimenting with telemedicine between 1998 and 2000, and from 2000 to 2010, they documented 135,000 telemedicine activities, including remote consultations, teleradiology, and telepathology services. By the end of 2010, the Alentejo region had trained 848 healthcare professionals in telemedicine at 52 locations (Oliveira et al., 2012).

North American and European countries started attempts and applications of telemedicine early, but they have needed to make faster progress. Contreras et al. (2020) point out that, according to a report submitted to the US Congress in 2016, the US Department of Health and Human Services estimated that over 60% of US hospitals used telemedicine in some form. Between 2004 and 2017, the use of telemedicine improved significantly. The increase in primary care and mental health services drives this growth, while other specialties experience a slightly higher utilization rate.

The COVID-19 pandemic has dramatically accelerated telemedicine applications (Ortega et al., 2020). Concurrently, to address COVID-19, corresponding bills and policies in the US have also provided telemedicine support. The evidence supports the notion that telemedicine has been instrumental during the pandemic; it has reduced contact between patients and helped avoid cross-infection while providing treatment services (Baudier et al., 2021). The Centers for Medicare and Medicaid Services attempted to reduce face-to-face medical visits through the 1135 waiver and the Coronavirus Aid, Relief, and Economic Security Act. This legislation permitted original Medicare beneficiaries to enjoy the same telemedicine benefits that Medicare Advantage beneficiaries received as of January 2020. The waiver also provided equal reimbursement for telemedicine visits via video and traditional face-to-face consultations.

Additionally, some individual states relaxed medical licensing regulations related to cross-state patient care (Contreras et al., 2020). Under the joint impetus of the pandemic and legislative actions, there was a significant increase in the use of telemedicine. A report on remote consultations during the COVID-19 pandemic in New York City mentioned that outpatient remote consultations increased from fewer than 50 per day to over 1,000. Emergency

remote consultations increased from 82 to 1,336 (Hincapié et al., 2020). As Dallas County began implementing stay-at-home orders on March 15th, 2020, telemedicine visits at the University of Texas Southwestern Medical Center jumped from 190 in the first half of March to 6,876 in the second half. In April 2020, patients scheduled 34,706 telemedicine visits and completed 25,197 (Wamsley et al., 2021). Contreras et al. (2020) also noted that the utilization of telemedicine significantly increased in response to changes in regulatory policies and the suspension of face-to-face consultations. In Contreras's institution, telemedicine visits jumped from fewer than 100 per day to over 2,200 per day within one week. Data by Reitzle et al. (2021) showed that while there were only 200 telemedicine consultations per month among 70 million health insurance claims in 2019, by 2020, the number of telemedicine consultations had reached 200,000. A survey study conducted in Germany, the Czech Republic, and Slovakia also demonstrated a substantial increase in the use of telemedicine during COVID-19 (Humer et al., 2020).

The significant increase in the usage of telemedicine due to COVID-19 and policy initiatives also stems from the inherent convenience and usefulness of telemedicine itself. Scholars have been focusing on and researching telemedicine for a relatively long period and have achieved some research results. Therefore, based on a review and analysis of past literature, it is beneficial for a better understanding of telemedicine. The findings from the study by Ekeland et al. (2010), which reviewed and analyzed 1,593 pieces of literature, indicated that telemedicine could provide patients with better healthcare at a lower cost. These findings also demonstrate that the healthcare field is increasingly recognizing the role of telemedicine.

Additionally, a study conducted at the Pediatric Diabetes Center in the Liguria region of Italy revealed that patients in diabetes care welcomed telemedicine (Bassi et al., 2022). Additionally, A. Q. Zhang et al. (2022) conducted a meta-analysis on the use of telemedicine by diabetic patients. The analysis revealed that after telemedicine interventions, patients showed reductions in glycated haemoglobin, fasting blood glucose, and postprandial blood glucose levels. This analysis result also demonstrates the usefulness of telemedicine. Furthermore, Morrison et al. (2022) analyzed a research cohort that included 52,000 infants born at 30 weeks of gestation or earlier, weighing 1500 grams or less. The study concluded that using a telemedicine system equipped with artificial intelligence for screening retinopathy of prematurity had the same effectiveness and could result in lower costs. In medical education, Budakoğlu et al. (2021) conducted a systematic review analysis of the effectiveness of telemedicine in undergraduate education, finding evidence of its effectiveness.

Meanwhile, Jordan et al. (2021) sought to understand the benefits and drawbacks of

telemedicine in treating chronic diseases from the perspectives of patients and healthcare providers. Semi-structured interviews suggested that the most significant advantage of telemedicine was the reduction in travel and cost savings. This study also reflects the characteristic accessibility of telemedicine.

North American and European countries have been pioneers in exploring and applying telemedicine, with many nations conducting in-depth research on its technological applications and legal regulations. Through legislation and policy support, these countries have ensured the quality and safety of telemedicine services, thereby achieving significant accomplishments in this field. For example, due to their extensive geographic distribution and lower population density, the Nordic countries have successfully integrated telemedicine services into their national healthcare systems, providing efficient medical services and reducing the travel burden for patients. The US has also made progress in telemedicine, particularly in rural and remote areas, where telemedicine services have helped to improve the uneven distribution of medical resources. As technology continuously advances and laws and regulations become more perfected, experts expect telemedicine to find wide application and development globally.

The US federal government has established multiple policies regarding telemedicine, including state-level patient privacy laws such as the Health Insurance Portability and Accountability Act. Other aspects include federally controlled substance treatment methods, subsidies for telemedicine programs, and Medicare coverage for telemedicine (Suwadi et al., 2022). Various states in the US have enacted telemedicine-related policies, including licensure for telemedicine practice, patient-informed consent, and regulations for online prescription of medications. States have also set rules on what telemedicine insurance will cover (Cheng et al., 2020). In Poland, Flaga-Gieruszyńska et al. (2020) suggested, through an analysis of literature related to telemedicine laws in other European countries, that Polish legislators need to introduce legal solutions further to promote the development of telemedicine in Poland. Meanwhile, Germany passed legislation related to electronic health in 2015, which helps protect patient privacy and fosters the regulated development of telemedicine (Marx & Beckers, 2015). The establishment of legal regulations is also an essential safeguard for advancing the development of telemedicine.

1.1.3 Development of IH in China

Following the development of telemedicine in North American and European countries, China began to explore telemedicine. On August 21st, 2014, the National Health and Family Planning Commission issued a document titled "Opinions of the National Health and Family Planning

Commission on Promoting Telemedicine Services by Medical Institutions." Guided by these opinions, in October 2014, the Guangdong Provincial Second People's Hospital launched the "Network Hospital of Guangdong Province", marking the official operation of one of the first online telemedicine services in the country. Utilizing an Internet platform and supported by audio-video technology, artificial intelligence, and IoT technologies such as medical wearable devices, the Network Hospital of Guangdong Province systematically connected primary healthcare institutions, community properties, pharmacies, and other consultation points to provide a new type of telemedicine service that offers convenient medical services to community residents. The network hospital established over 30 online consultation points, mainly cooperating with community medical centers and large pharmacy chains (S. X. Xu, 2020). This service model was an early exploration of telemedicine services in China and laid a solid foundation for developing IH in China, exploring a new medical service delivery model.

On December 7th, 2015, the Wuzhen Internet Hospital officially went online under the name "Internet Hospital," China's first electronic prescription was issued there (H. F. Zhang, 2018). Leveraging the Internet and Artificial Intelligence (AI) technology, Wuzhen Internet Hospital connected with more than 2,700 hospitals nationwide and 220,000 doctors, establishing 12 specialized remote consultation centers for specific diseases. The Wuzhen Internet Hospital's core services included online follow-up consultations between doctors and patients and remote consultations between doctors. This initiative opened up new avenues for the development of IH in China.

As smartphones continue to increase in China and the construction of China's 4G and 5G networks progresses, a digital and intelligent lifestyle transforms people's lives. Online shopping, mobile payments, and other scenarios constantly make people feel the convenience of digital transformation. The public holds a positive attitude towards the new business models of various industries under the digital transformation. In 2015, the State Council of China issued the "Guiding Opinions of the State Council on Actively Advancing the Internet Plus Action," which proposed to actively promote the development of new models of online medical services. The document guided hospitals to use the Internet to provide convenient services such as appointments, payments, and access to diagnostic reports, thereby improving the patient experience and satisfaction. With the deepening integration of the Internet and medical service processes, accompanied by the continuous exploration and attempts of IH, in 2018, the General Office of the State Council issued the "Internet Hospital Management Measures (Trial)." The "Measures" separated IH from the concept of telemedicine and clarified the basic standards for IH, including the scope of medical services, departmental setup, personnel qualifications,

equipment and facilities, and regulations and systems. China has proposed a Chinese solution for constructing and developing IH, carving out a development path for IH with Chinese characteristics.

According to the "Internet Hospital Management Measures (Trial)," IH in China represents a different form of medical institution, offering functions such as consultations by doctors to patients, prescription renewals for follow-up patients, and family doctor contract services. Compared to telemedicine in North American and European countries, the functions of IH are more specific. IH manages as a medical institution, providing patient consultations, renewing prescriptions for chronic disease patients, and offering family doctor contract services. China's management policies offer institutional guarantees to IH development and effectively promote its standardized and healthy growth in China. This thesis compiles the policies related to the development of IH issued by the Chinese government from 2015 to 2022, as shown in Table 1.1.

Table 1.1 Internet medical-related laws, regulations, and policies

Release Date	Title
Jul 2015	Guiding Opinions on Actively Promoting the "Internet Plus" Action
Feb 2016	Regulations on the Administration of Medical Institutions
Oct 2016	Outline of the "Healthy China 2030" Plan
Apr 2018	Opinions on Promoting the Development of "Internet Plus Medical and Health"
Jul 2018	Interim Measures for the Administration of Internet Diagnosis and Treatment
Jul 2018	Interim Measures for the Administration of Internet Hospitals
Jul 2018	Basic Standards for Internet Hospitals
Aug 2019	Guiding Opinions on Improving the Pricing of "Internet Plus" Medical Services and Medical Insurance Payment Policies
Aug 2019	Drug Administration Law (Revised in 2019)
Feb 2020	Notice on Strengthening the Information Technology Support for the Prevention and Control of the COVID-19 Pandemic
Feb 2020	Notice on Providing Internet Diagnosis and Consultation Services for the Prevention and Control of the COVID-19 Pandemic
Feb 2020	Opinions on Deepening the Reform of the Medical Security System
Feb 2020	Guiding Opinions on Promoting the "Internet Plus" Medical Insurance Services during the COVID-19 Pandemic Prevention and Control Period
May 2020	Notice on Further Promoting the Development and Standardized Management of Internet Medical Services
Oct 2020	Guiding Opinions on Actively Promoting the Medical Insurance Payment Work of "Internet Plus" Medical Services
Mar 2021	The 14 th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through the Year 2035 of the People's Republic of China
Jun 2022	Regulations for the Supervision and Administration of Internet Diagnosis and Treatment (Trial)

National policies have supported IH, providing institutional guarantees for compliant development. These policies have propelled the rapid development of IH and regulated its healthy growth. Driven by these policies, some hospitals have begun to establish IH, marking the commencement of the construction of IH in China.

At the initial stage of the construction of IH, they encountered the outbreak of COVID-19 pneumonia in early 2020. Like telemedicine in North American and European countries, Chinese IH achieved rapid development under the external pressure of the COVID-19 pandemic. By June 2020, China had approved the establishment of nearly 600 IH (Q. M. Li & Shi, 2021). By the end of December 2020, there were 795 IH affiliated with public hospitals, accounting for 79.9% of the total number of IH in China, of which tertiary hospitals constructed 540, there were 200 IH of other types, making up only 20.1% (Chi et al., 2021). IH associated with tertiary public hospitals has also become essential in constructing IH in China. In the fight against the COVID-19 pandemic, just like telemedicine in Europe and America, IH played a significant role in China. They provided medical services to patients who could not leave their homes to continue chronic disease treatments, preventing the spread of the COVID-19 virus caused by crowd gatherings and ensuring the treatment of patients' diseases. In the later stages of the COVID-19 pandemic, due to the inherent characteristics of IH, medical institutions recognized the potential for future development of IH, and an increasing number of medical institutions began to build IH. As of June 2022, China had approved the establishment of over 1700 IH, more than doubling the number since 2020. China's IH has entered a period of rapid development.

Uneven economic and social development marks China's vast territory across different regions. Influenced by socio-economic development, the distribution of high-quality medical resources in China tends to align with the economic and social development of cities or urban clusters, resulting in a concentration of these resources in larger cities or metropolitan areas. To further balance the medical standards across various regions, the state has introduced a series of policies and measures to support the development of grassroots medical institutions. The state has promoted comprehensive reforms in public hospitals to enhance the equity of medical resource distribution, focusing on the supply side of medical services. Research by Zheng and Li (2019) indicates that the core value of medical supply-side reform is to optimize resource allocation to the greatest extent and meet patients' medical needs. Initiating supply-side reforms in medical services through "Internet Plus" is a trend. Studies by Liu and Gao (2021) show that fully utilizing information technology to advance the development and popularization of Internet medical services can help improve the equity of medical resources and the accessibility of high-quality medical services. Post-COVID-19, IH, due to its accessibility and convenience, has seen its potential to expand the reach of hospital medical services further recognized by the state and medical institutions. It is precisely because of the unique advantages of IH that they can effectively improve the equity of medical resources and the accessibility of high-quality

medical services. "The 14th Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2035" outline the promotion of the joint development and deep integration of online and offline public services, actively developing IH.

In summary, with the continuous support of national policies and the digital transformation of Chinese society, IH is inevitably set to transition from rapid to high-quality development. The existing cognition and behavioural science fields within the medical industry will inevitably need to form new understandings of internet-based medical care. Under this new situation driven by innovation, the continuous maturation of internet technology and the ongoing development of digital wearable medical devices will keep pushing the innovation of service models in IH. During constant optimization and innovation of service models, the willingness of users to utilize these services becomes particularly important. The reason for this importance is that the ultimate goal of IH is to serve patients and improve the accessibility and convenience of medical services. Doctors serve a dual role in the context of IH; they are not only users of the digital platform but also providers of diagnostic and therapeutic services to patients within this virtual healthcare setting. The extent to which doctors accept this innovative model of medical services IH provides will greatly influence these institutions' development prospects.

1.2 Research problem

IH represents an innovative medical service model in the healthcare industry, empowered by the continuous advancement of the Internet and information technology. Compared to traditional medical service models, IH offers patients remote consultations and electronic prescriptions, significantly enhancing the efficiency of medical services. This model has not only played a vital role in the control and prevention of the COVID-19 pandemic but has also provided a new solution to the problem of uneven distribution of medical resources in China.

IH offer patients a convenient way to access high-quality medical resources, and there is a good awareness among patients regarding these facilities. L. Z. Zhao et al. (2022) surveyed outpatient patients' awareness, cognition, and usage questionnaires. The survey revealed that the awareness rate of IH among patients reached 76.7%. However, their research also pointed out another phenomenon: despite the high awareness rate among patients, the actual usage rate needed to be higher. This survey result is consistent with the findings of the "2021 China Internet Hospital Development Report." According to the report, the average daily number of

consultations in IH hosted by physical medical institutions was 55 visits per day, and the number of IH that have achieved a market-oriented operational mechanism is very few (National Telemedicine and Connected Healthcare Center, 2021). Some practical issues with IH in China, such as "built but not used" or poor operation. These observations indicate that the actual usage of IH could be better, highlighting problems with their application in practice.

Doctors, as the core service providers of IH, directly impact the development of these institutions. Chinese doctors face immense work pressure, and their workload is already substantial. According to statistics from the World Bank, in 2019, China had 2.22 doctors per thousand population, while European Union countries had reached 3.91 doctors per thousand population in 2018, with the figure for Europe as a whole even higher at 4.12 (World Bank, n.d.). These statistics raise a critical question as to whether the healthcare systems, particularly in regions with lower doctor-to-population ratios, can learn and adapt to the new IH diagnostic and treatment models.

Secondly, as an internet platform for medical services, IH is also influenced by traditional doctor-patient relationships. Szasz et al. (1958) categorize doctor-patient relationships into three types: the active-passive model, the guidance-cooperation model, and the mutual participation model. Due to the specialized nature of medical knowledge, there is an issue of information asymmetry between doctors and patients. Therefore, in the real-world setting, the doctor-patient relationship more often takes the form of the "guidance-cooperation model." Under this model, a doctor's recommendations frequently impact a patient's choices. Even though patients are aware of and willing to use IH, if doctors cannot accept this new model of diagnosis and treatment offered by IH, patients will not be able to receive medical services through these online platforms.

Therefore, gaining a deep understanding of doctors' attitudes towards IH and the factors influencing their acceptance is of great significance for promoting the development of IH. Research can reveal doctors' perceptions of this emerging service model and help devise strategies to improve the collaborative relationship between doctors and IH, address practical operational issues, and enhance the accessibility and convenience of medical services.

1.3 Research questions

Given the pivotal role that doctors play in the development of IH, this study aims to construct a research model based on an empathy-extended UTAUT and to propose relevant hypotheses. We plan to collect data through a questionnaire survey to validate these hypotheses and use

empirical data analysis to identify and explain the key factors influencing doctors' use of IH in Guangdong Province, aiming to address the issues encountered in the practical operation of IH. To gain a deeper understanding of doctors' willingness and behavior regarding the use of IH, this study poses the following three research questions:

1. How do performance expectancy, effort expectancy, and social influence specifically affect doctors' intentions to use IH within the UTAUT model? Additionally, how do usage intentions and facilitating conditions concretely influence doctors' actual usage behavior of IH?
2. In the empathy-extended UTAUT model, how specifically does empathy influence doctors' intentions to use IH? How effective is this model in explaining doctors' usage intentions?
3. Based on the empathy-extended UTAUT model and research findings, how will we design specific intervention measures to enhance doctors' intentions and behaviors towards using IH?

1.4 Research purposes

This study investigates the acceptance and utilization patterns regarding IH among medical practitioners. Given the rapid evolution of IH, a comprehensive understanding of doctors' perspectives is imperative for the productive implementation and sustainable advancement of this nascent service model. The primary objectives of this study are delineated as follows:

1. Evaluation of Performance Expectations: This involves scrutiny of doctors' expectations regarding the performance of IH, with an explanation of how these expectations shape their acceptance levels and intentions to engage with IH.
2. Examination of Effort Expectations: This objective aims to identify the impediments doctors encounter in learning and utilizing IH and discern the influence of these challenges on their inclination towards IH adoption.
3. Analysis of Social Influence: This entails investigating the impact of internal medical industry dynamics and socio-cultural factors on doctors' attitudes and acceptance of IH.
4. Identification of Facilitating Conditions: This objective seeks to ascertain the effects of facilitating conditions on promoting doctors' utilization behaviours in the context of IH.
5. Exploration of the role of Empathy: This objective delves into the influence of doctors' empathy on their acceptance levels and engagement with IH.

In summary, this study delves into the intricate landscape of doctors' acceptance and utilization of IH. As the healthcare industry witnesses the rapid evolution of IH, understanding doctors' perspectives becomes pivotal for its effective implementation and sustained

development. This study will address critical facets, including performance expectations, effort expectations, social influence, facilitating conditions, and empathy. By comprehensively examining these dimensions, this research contributes valuable insights that can inform strategies for enhancing doctors' acceptance and engagement with IH, fostering seamless integration into contemporary healthcare practices. This study's findings are expected to help healthcare stakeholders make informed decisions and contribute to the ongoing discourse on adopting innovative healthcare service models.

1.5 Research paradigm

A research paradigm refers to the fundamental beliefs and method that guide scientific inquiry, influence the construction of research questions, select research design, data collection and analysis methods, and interpret research findings (Mackenzie & Knipe, 2006). This study follows the positivist research paradigm, which advocates for the acquisition of objective knowledge about phenomena through systematic observation and measurement, and emphasizes the central role of the scientific method in the discovery of knowledge, thereby ensuring the repeatability and verifiability of research results (Mackenzie & Knipe, 2006; Mark et al., 2016). Our research objective is to use quantitative methods to delve into the extent of doctors' acceptance and intentions to use IH and identify and analyze the correlations or potential causal relationships between variables.

1.5.1 Reasoning method

This study aims to uncover and analyze the factors influencing doctors in Guangdong Province to adopt IH. To this end, we will employ a deductive reasoning approach, starting from established theories (such as the UTAUT model and empathy) and synthesizing insights from existing literature to distil a theoretical framework. Based on this framework, we will formulate a series of specific research hypotheses that will guide our empirical study. Subsequently, we will collect data using carefully designed questionnaire surveys to test our hypotheses. Specifically, we will assess how various factors—including but not limited to performance expectancy, effort expectancy, social influence, facilitating conditions, and empathy—affect doctors' intentions to accept and use IH. Through this method, we will be able to validate theoretical assumptions and deepen our understanding of the key drivers in the acceptance process of IH.

1.5.2 Ontology

In this study, the ontological issues we explore focus on doctors' intentions to use IH. We perceive this phenomenon as an entity composed of multiple factors: performance expectancy, effort expectancy, social influence, facilitating conditions, and empathy. We maintain that these factors, though manifested through social interactions and individual psychological processes, significantly impact doctors' behavioural intentions and decision-making processes. Therefore, this research aims to validate these factors as elements of reality and to investigate how they function in the intentions of doctors in Guangdong Province to use IH.

1.5.3 Epistemology

This study adopts a positivist stance on the epistemological level, formulating testable hypotheses through deductive reasoning from theory and validating these hypotheses with empirical data. We acknowledge that the subjectivity of researchers and participants may influence the interpretation of the study's results. To minimize this influence and ensure the objectivity and reliability of the results, we will use standardized questionnaire tools, conduct anonymous surveys, and design reverse questions in the questionnaire to check for consistency. Additionally, we will employ statistical methods to analyze the data, which can provide replicable results and an objective interpretation of the data. Through this approach, we aim to gain a profound and accurate understanding of doctors' intentions to use IH.

1.5.4 Axiology

Researchers widely regard the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a theoretical framework with solid predictive power when researching technology acceptance and usage. However, the acceptance and use of IH are not limited to technology acceptance alone; they also profoundly involve multiple dimensions, such as doctors' understanding of patient needs and empathy. In light of this, our study extends the UTAUT model by incorporating the critical dimension of empathy to capture the motivations behind doctors' use of IH more comprehensively.

Within the expanded UTAUT model, we carefully analyze the model's traditional components, such as performance expectancy, effort expectancy, social influence, and facilitating conditions, and specifically explore how empathy affects doctors' acceptance of IH. To validate the impact of these factors, we have designed a questionnaire survey to collect data on doctors' attitudes towards using IH, their perceived level of empathy, and other relevant

factors.

Through this approach, we expect to provide deeper insights regarding the traditional perspectives of technology acceptance models and broader issues of medical service acceptance, including humanitarian care and the quality of doctor-patient interactions. Such research is instrumental in understanding the psychological mechanisms behind technology acceptance and is significant for promoting the effective implementation of IH and enhancing the quality of medical services.

1.5.5 Research type

This study employs an empathy-extended UTAUT model as its theoretical foundation. It aims to explain and validate the key factors influencing doctors in Guangdong Province to use IH through empirical data analysis. Consequently, we focus on identifying and quantifying these factors, which gives this research an explanatory nature. More importantly, we seek to deeply understand how these factors affect doctors' intentions and behaviour toward using the service. By revealing the motivations and decision-making processes behind doctors' acceptance and use of IH, this study aims to provide insights into how to increase the acceptance of IH.

1.5.6 Research method

This study adopts an empirical research method framework, specifically through surveys to collect data. Surveys are a widely recognized method capable of effectively collecting standardized information, facilitating quantitative analysis and statistical testing of hypotheses. Based on critical variables identified from the literature review, we will design a questionnaire and use validated scales to ensure that the constructs measured are highly reliable and valid. The questionnaire was distributed electronically to a selected sample of doctors to collect data on their intentions to use IH.

After the data collection is complete, we plan to use SPSS software to perform descriptive statistical analysis, which will help us outline the essential characteristics of the sample and the distribution of the main variables. To ensure the reliability of the scales, we will conduct a reliability analysis to assess the internal consistency of the questionnaire. Furthermore, we will use AMOS software for validity testing, confirmatory factor analysis, and structural equation modelling analysis. These analyses will help us evaluate the fit of the measurement model and validate the research hypotheses.

Using the results of the empirical analysis, we can verify the research hypotheses and

further investigate the factors that influence doctors' acceptance of IH. We will discuss the consistency and differences between the quantitative results and the existing literature and, based on this, propose specific strategic recommendations. These recommendations aim to enhance doctors' acceptance of IH, supporting effective management and sustainable development.

1.6 Thesis structure

The thesis consists of six chapters.

Chapter One serves as the introduction to the study. In the introduction, we are elaborating on the background of the research, including the rise of IH and its role in the current healthcare system. At the same time, we present the core question of the study, which is the degree of doctors' acceptance and intentions to use IH and how their empathy affects this acceptance. This chapter also clarifies the purpose of the study, namely, to reveal the factors influencing doctors' acceptance of IH and the impact of empathy on their use of IH. Additionally, we introduce the research paradigm we are adopting in this study, including our philosophical stance and the choice of research methods, and provide an overview of the overall structure of the thesis.

Chapter Two is the literature review section. This chapter begins with an in-depth literature review of the concept, types, and characteristics of IH. Following that, we analyze current research on IH, particularly the role and impact of doctors within this model. This chapter also reviews stakeholder theory to understand doctors' acceptance of IH better. It critically analyzes theories related to technology acceptance, discussing their applicability and limitations in the context of IH. Additionally, we will elucidate the role of empathy in doctors' intentions to use IH and underscore its significance through literature analysis. Based on these literature analyses, we propose the research hypotheses of this study, aiming to fill the gaps in existing research and provide theoretical support for the future development of IH.

Chapter Three is the research method section of this study. In this chapter, we provide a detailed introduction to the construction of the research model, including the anticipated relationships between variables and their significance in the context of IH. The questionnaire design is based on the theoretical framework and existing validated questionnaires to ensure the validity and reliability of the instrument. We also describe the selection criteria for the questionnaire respondents, the distribution method, and the choice and applicability of data analysis methods. This chapter details how to protect participants' privacy and data security during the research process, including the procedure and outcomes of the ethical review, thereby

ensuring the ethical nature of the research.

Chapter Four is the data analysis section of the study. This chapter presents descriptive statistical analyses of the research data, including the demographic characteristics of participants and a discussion of the sample's representativeness. We report the results of reliability and validity tests and explain their significance for the research conclusions. The structural equation modelling analysis results include model fit indices and path analysis outcomes. Finally, we validate the research hypotheses and discuss the significance of the results.

Chapter Five is the discussion section. We discuss the research findings in detail, comparing them with the existing literature and exploring their consistencies and discrepancies. Through this comparison and dialogue, we hope to reveal this study's contributions and provide a solid foundation for further academic inquiry and practical application.

Chapter Six is the conclusion and outlook section. This chapter summarizes the study's main findings and discusses their theoretical and practical significance. At the same time, we identify the limitations encountered during the research process and propose potential directions for future research based on these limitations. These discussions offer references for the continuous development and optimization of IH and guide subsequent researchers on their exploratory paths.

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Chapter 2: Literature Review

This chapter will introduce fundamental theories and concepts and provide an overview of related literature studies in the thesis. Reviewing relevant research literature will further clarify the research direction, define the research theme, and solidify this study's theoretical and literature foundation.

2.1 Internet hospitals

This section will conduct a literature review and synthesis from three aspects: the concept of IH, its characteristics, and its impact on traditional medical models.

2.1.1 The concept of IH

IH represent an innovation in medical service models by Chinese healthcare providers during the digital transformation of Chinese society, adapting to changes in the external environment. Wuzhen Internet Hospital first coined the term IH. The official document introduced this concept in 2018. The General Office of the State Council of the People's Republic of China published the "Opinions on Promoting the Development of 'Internet Plus Healthcare'" (State Council Issuance [2018] No. 26), which introduced the concepts of "Internet hospitals," "Internet medical services," and "Internet diagnosis and treatment," and allowed the development of IH based on medical institutions (General Office of the State Council of the Peoples Republic of China, 2018). It marked the first mention of Internet hospitals in national policy documents. According to the document, medical institutions can use "Internet hospital" as a secondary name and build upon the infrastructure of physical hospitals. They can employ Internet technology to provide safe and appropriate medical services. It allows for the online management of follow-up consultations for certain common and chronic diseases. After doctors can access patients' medical records, they can issue prescriptions online for certain common and chronic diseases.

Subsequently, the National Health Commission of the People's Republic of China and the National Administration of Traditional Chinese Medicine issued the "Internet Hospital Management Measures (Trial)", which clarified the relevant management methods for IH

(‘National Health Commission of the People’s Republic of China & ‘National Administration of Traditional Chinese Medicine’, 2018). These measures specify the basic standards for IH:

1. They clarify that IH must limit its scope of medical services to match those provided by the corresponding physical medical institutions. These institutions serve as the foundation for IH's services.
2. It requires that the clinical departments set up for IH's business operations match the ones in the physical medical institutions. These institutions provide the necessary support for IH's departments.
3. The measures provide specific regulations for the personnel involved in IH.
4. They define the hardware facilities the IH must have, such as servers, databases, and network access.
5. There must be corresponding management systems and business processes in place.

The documents above introduced the term "internet hospital" and set forth clear regulations regarding the functions and standards of IH. The IH possesses both the attributes of the Internet and traditional healthcare. It is a specific implementation of telemedicine, referring to how doctors use internet tools, such as APPs or computers, to provide medical services directly to patients, including medical consultations and prescription issuance. Currently, the state must administratively approve IH, and it manages them according to the medical institutions' model. Some scholars have defined IH in their research. However, there has yet to be a unified definition of IH in official documents and the academic community.

Chang and Chen (2016) noted that IH is a medical institution that provides remote medical services directly to patients; that is, they use information technology to extend medical resources from within the hospital to the Internet, creating an online medical and health service platform. Meanwhile, Han et al. (2020) proposed that IH are internet medical platforms that combine online and offline access to medical institutions, directly offering patients various remote medical services. From the perspective of the forms of diagnosis and treatment conducted by IH, they pointed out that IH are diagnostic and treatment platforms that use internet technology to provide remote medical services to patients.

As the development of IH in China continues to progress, scholarly research on the subject is also increasing. Huang et al. (2021) pointed out that IH represents the application of "Internet Plus" in the healthcare industry, signifying a deep integration of information communication, the Internet, and hospitals. Specifically, hospitals utilize Internet technology to provide medical services and meet patients' medical needs, representing a novel model that improves the mode of medical services and extends the reach of healthcare services. Experts suggest that IH should

utilize more than just information and network technology; it must also integrate deeply with physical hospitals. They also note that IH improves the medical service model and extends healthcare service reach. The concept of IH is interpreted not only from the perspective of the forms of diagnosis and treatment they offer but also in terms of the relationship between IH and physical hospitals and the functions of IH.

In the study by H. Zhang et al. (2022), researchers believe that IH builds upon physical hospitals, primarily focusing on follow-up consultations and routine advice. They offer a one-stop platform integrating consultation, prescription, payment, and medication delivery. The scope of diagnosis and treatment is mainly for chronic diseases and follow-up consultations for certain common illnesses, with strict prohibitions on initial consultations. The research defines the concept of IH by combining national regulations related to IH and describes the organizational form, service functions, and service models.

This study synthesizes the concepts from the above scholars. It considers IH in China a new medical institution that must obtain approval from the relevant national health administrative departments for its establishment. They utilize Internet and network technologies to integrate with physical medical institutions, providing patients with services such as online consultations, electronic prescriptions, online payment, medication delivery, and health management. Moreover, IH must have the appropriate personnel and hardware conditions and possess the necessary management systems and operational processes. In sum, IH represents an innovation in the medical service model made by healthcare providers to adapt to the digital transformation of society amidst the rapid development of the Internet and information technology.

2.1.2 Types of IH

According to the "Internet Hospital Management Measures (Trial)" issued by the National Health Commission, IH in China is currently divided into two main types. The first type is the IH, which serves as a second designation of a physical medical institution. This type of IH represents a medical institution approved by the National Health Administrative Department. It employs Internet technology and its own medical facilities and personnel to offer medical services online, which it initially provided offline. This type of IH should include the medical institution's name followed by "Internet Hospital" to form a new designation.

Third-party organizations independently establish the second type and rely on physical medical institutions. Here, "third-party organizations" refer to entities other than physical medical institutions. China's first Internet hospital, Wuzhen Internet Hospital, is a representative example of this type. The WeDoctor Group, the People's Government of Tongxiang City, and

the Fourth People's Hospital of Tongxiang City jointly established Wuzhen Internet Hospital. WeDoctor, a limited company, primarily operates within the digital health sector. The Fourth People's Hospital of Tongxiang City is the foundation for Wuzhen Internet Hospital. Unlike the IH naming convention, which typically serves as a secondary designation for a physical medical institution, Wuzhen Internet Hospital adopts a more flexible approach to naming. For instance, it takes its name from a location, followed by the abbreviation "IH," as in "Wuzhen Internet Hospital." A third-party organization independently establishes its construction and operation model.

Scholars have categorized the current IH in China into three types. The first type is where physical medical institutions directly provide online medical services. This model aligns with the first category described in the "Internet Hospital Management Measures (Trial)", where the IH serves as the second designation of a physical medical institution. The second type is a platform service model that aggregates medical resources. Internet companies initiated this model by building the platform and completing its registration. It invites doctors from medical institutions to provide medical services on the platform through a multi-site practice approach. The third model is a service model that merges medical institutions with third-party platforms. In this service model, medical institutions collaborate with internet platforms, with the medical institutions providing medical personnel and hardware facilities, while internet companies provide the service platform. Each leverages its business expertise to advance medical resource integration jointly (Xu et al., 2020).

Scholars have categorized IH based on their operational models into five types. The first type is self-built and self-operated, referring to medical institutions or enterprises that invest their funds, assemble technical teams for construction, and operate independently. The second type is self-built but enterprise-operated, where medical institutions invest in construction costs and select technology manufacturers to undertake operations. The third type is jointly built and managed, where medical institutions and partnering enterprises invest together and operate jointly. The fourth type involves settling into a government platform, which refers to joining an Internet hospital platform constructed by local governments. The fifth type is settling into a corporate platform, which refers to joining the IH platform built by enterprises (Wu et al., 2021).

As indicated above, regardless of how IH is classified, the essential aspect is the quality of medical services they can provide. In other words, it is the level of the doctors providing medical services on the IH. Therefore, during the development of IH, doctors, as a crucial resource, are highly sought after by these institutions. In China, most medical resources, especially high-quality ones, are found in public hospitals. Consequently, the IH systems

constructed directly by these hospitals have the most significant advantage in developing IH. Data also shows that the number of IH built by public hospitals in China is dominant. According to data from Yu (2022), IH in China are mainly led by hospitals and enterprises, with hospital-led ones accounting for the vast majority at 78% and enterprise-led ones at 22%. Among these, public hospitals comprise 71%, while private hospitals account for 7%. These data reaffirms that public hospitals dominate the majority of IH in China.

2.1.3 Characteristics of IH

The essence of IH is still to provide medical services to patients. However, IH represents innovation and development of medical services utilizing the Internet and information technology. They possess their advantages and characteristics compared to traditional medical services:

1. IH relies on internet technology to penetrate space, reducing the distance patients need to travel from their residence to the hospital.
2. IH break the constraints of time. Doctors can use internet technology to provide diagnostic and treatment services during fragmented times, avoiding time limitations.
3. IH extend the accessibility of medical services through Internet technology.

Internet technology dramatically increases the reach and accessibility of a hospital's medical services. In conclusion, IH offers convenience, accessibility, and the ability to break through time constraints.

2.1.3.1 Convenience of IH

IH leverages internet technology to overcome spatial distances, enhancing the accessibility and efficiency of medical services. Relying on network technology, the Internet can facilitate the exchange of information and videos, and even AI technology can create virtual consultation rooms. It allows IH to provide diagnoses and treatments over greater distances than traditional physical medical institutions, increasing the convenience for patients and reducing the need for travel between their residence and the hospital. China continuously develops 5G technology and increasingly promotes remote ultrasound examinations and surgery techniques. This convenience will significantly propel the development of IH in China.

Chinese scholars have also researched the convenience of IH. Lai et al. (2021) pointed out that the primary purpose of constructing IH is to provide services for patients with common and chronic diseases or those living in remote and rural areas. IH has effectively promoted convenient and efficient access to medical services for patients, significantly saving the time

patients and their families travel between their residences and the hospital. In addition, research by Zhi et al. (2021) indicates that patients living in remote areas need help accessing high-quality medical resources from urban hospitals due to economic and distance constraints. Even patients living in cities sometimes prefer not to visit hospitals frequently, especially during sudden health events like the COVID-19 pandemic. Developing IH may be an excellent solution to this dilemma. Patients can conveniently access high-quality medical services through web-based diagnosis and treatment without wasting money on transportation and waiting time. IH have an advantage in terms of economic and time costs. Meanwhile, research by Y. Li et al. (2022) also shows that IH provides convenience for patients seeking medical care. Y. Shi et al. (2021) conducted a study on the pediatric specialty IH, noting that this convenient service model of IH has improved compliance with follow-up visits for patients with chronic diseases.

2.1.3.2 Accessibility of IH

In addition to their convenience, IH, supported by internet technology, can also enhance the accessibility of medical services, allowing healthcare to reach further into the field. This characteristic also makes IH an effective way to address the uneven distribution of medical resources. It is also an important reason IH still has potential for development and growth after the COVID-19 pandemic.

Many Chinese scholars have also reflected on the accessibility of IH in their research. Research by Ge et al. (2022) on IH in Zhejiang Province, China, found that the general characteristics of IH users are middle-aged and young women living in Zhejiang and its surrounding provinces. The accessibility of IH has expanded from the areas surrounding the hospitals to encompass the provinces around the medical institutions and their respective cities. The study also indicates that IH can extend the convenience of services provided by physical medical institutions, breaking down spatial distances and allowing patients from further away access to high-quality medical services. Ren et al. (2020) also believe that establishing IH allows patients not to be limited to seeking medical treatment only at offline physical medical institutions, further expanding the channels for patients to receive medical care. It also proves that the construction of IH has further improved the accessibility of medical services.

D. Li et al. (2020) pointed out that with the standardization of COVID-19 epidemic prevention and control, IH played an increasingly important role in providing medical and health services to the public. Their research also shows that by moving away from physical hospitals and utilizing IH, the accessibility of hospital medical services has been expanded. L. Li et al. (2020) also confirmed that in the early stages of the COVID-19 pandemic, IH could

help alleviate patients' psychological burdens and raise public awareness of the disease by timely and rapidly disseminating knowledge about its prevention and control. IH has broken down the walls of traditional hospitals and used Internet platforms to increase the accessibility of medical services.

2.1.3.3 IH Break the Barriers of Time

With the continuous promotion and popularization of 5G in China and the widespread use of smartphones, China's IH has achieved mobility, portability, and intelligence. It marks a clear departure from the early days of China's internet development, where doctors had to be stationed in front of clinic computers to provide timely medical services.

Owing to the characteristics of intelligence and convenience inherent to their design, IH has transcended temporal barriers in the provision of medical services, liberating the diagnostic and therapeutic interactions between doctors and patients from the constraints of time. Doctors often use their fragmented time to conduct medical activities through IH. From another perspective, this also increases doctors' working hours and expands the supply of medical services. At the same time, it addresses the issue of China's insufficient number of doctors per thousand population, further meeting patients' diagnostic and treatment needs. Although some scholars argue that doctors working in fragmented time may not guarantee the quality of work (Song, 2019), according to national policy requirements, IH mainly caters to stable chronic disease patients for medication renewals and simple consultation inquiries. Healthcare providers should promptly refer patients for offline consultation when their condition is unsuitable for Internet diagnosis and treatment. Therefore, from a positive standpoint, doctors providing medical services to patients through IH in their fragmented time can effectively increase the supply of medical services in China and meet patients' diverse needs for diagnostic and treatment times, further satisfying the medical needs of the Chinese people.

IH, utilizing internet technology, breaks time barriers and further expands the supply of medical services. It complements the traditional in-person consultation model of offline physical medical institutions. Because of such characteristics, IH holds a strategic position in the future development of medical institutions.

2.1.4 Research on IH

IH represent a specific implementation of telemedicine in China, derived from European and American practices. While they share similarities with telemedicine, there are also significant differences. Given that IH represent a modality and solution for telemedicine within China,

research pertaining to these digital healthcare institutions is currently predominantly conducted within the Chinese context. The literature review conducted in this thesis also validates it. To better understand the current state of research on IH, this study utilized databases such as Web of Science, ProQuest, and China National Knowledge Infrastructure (CNKI) for literature retrieval. A search for "Internet-hospital" as the subject in the CNKI database yielded 2,451 related documents. A search in the Web of Science core collection with "Internet-hospital" as the subject resulted in only 50 studies. The literature review in this thesis further demonstrates that IH is a product of China's digital transformation process, with Chinese scholars conducting more extensive research on the topic. The number of documents in the CNKI database is also significantly higher than in the Web of Science database.

2.1.4.1 Literature Review Method

To gain a deeper understanding of the current state of research on IH and to define the direction for further study in this research, a comprehensive literature review was conducted. This study incorporated all literature obtained from the CNKI database into the sample for literature data analysis. All retrieved literature samples were saved in RefWorks text format for subsequent processing and analysis.

This study utilized Citespace software as the primary tool for analyzing literature data and for constructing knowledge maps. By inputting the literature data into Citespace, this research generated co-occurrence network diagrams, cluster network diagrams, and trend analysis graphs of keywords. The objective was to uncover the research hotspots and developmental trends within the field of IH.

Keywords serve as the most direct elements in identifying research hotspots and refining research directions. They reflect the core ideas of articles and encapsulate the main content succinctly. Through keyword analysis, the research direction of this study can be further clarified. A total of 2451 literature entries retrieved from the CNKI database were imported into the Capacities software. After data curation, literature from the past decade was selected for analysis.

The Node Types were set to keywords, with a time span from January 2013 to December 2023, and Year Per Slice was set to 1 year. The Top N parameter was set to 25, meaning that the top 25 most frequent core keywords were extracted for each time slice. This process resulted in a keyword co-occurrence network consisting of 331 nodes and 543 links.

The analysis of this network not only facilitated the identification of the most significant themes and concepts within the field but also provided insights into the evolution of research

topics over time. By examining the density and centrality of the nodes, the study was able to determine the influence and connectivity of specific keywords within the research community. This methodological approach has enabled the research to map out the intellectual landscape of IH studies, guiding future research endeavors in a more informed and strategic direction.

2.1.4.2 Keyword co-occurrence map

The keyword co-occurrence map is an effective tool for visually presenting the relationships between research hotspots within a field of study. In this map, different keywords are represented by nodes, and the connections between these nodes indicate the co-occurrence relationships between the keywords. The size of a node directly reflects the frequency of occurrence of the keyword; the larger the node, the more often the keyword is mentioned in the research literature, indicating its greater importance within the field.

Furthermore, the color of the outer ring of the keyword node corresponds to the color on the timeline, allowing researchers to quickly identify changes in research hotspots over specific time periods. The width of the color on the outer ring of the keyword is determined by the frequency of occurrence of the keyword in that year, with a wider ring indicating more frequent mentions of the keyword in the research literature for that year, and indirectly reflecting the number of related articles published in that year.

By analyzing the keyword co-occurrence map, researchers can not only identify the core themes and research hotspots within a field but also observe the trends of these hotspots over time. For example, certain keywords may occupy central positions in the early stages of the map, indicating that they were the focus of research during that time period; as time progresses, new keywords may emerge and become new research hotspots, reflecting the dynamic development of the research field and the accumulation of knowledge.

In summary, the keyword co-occurrence map provides researchers with an intuitive view of research hotspots and the structure of knowledge. The keyword co-occurrence map for this study is shown in Figure 2.1.

CiteSpace, v. 6.1.R6 (64-bit) Basic
 February 9, 2023 at 4:46:23 PM CST
 CNKI: D:\CNKI\data
 Timespan: 2013-2023 (Slice Length=1)
 Selection Criteria: g-index (k=25), LRF=3.0, L/N=10, LBY=5, e=1.0
 Network: N=331, E=543 (Density=0.0099)
 Largest CC: 254 (76%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.6023
 Weighted Mean Silhouette S=0.8978
 Harmonic Mean(Q, S)=0.721

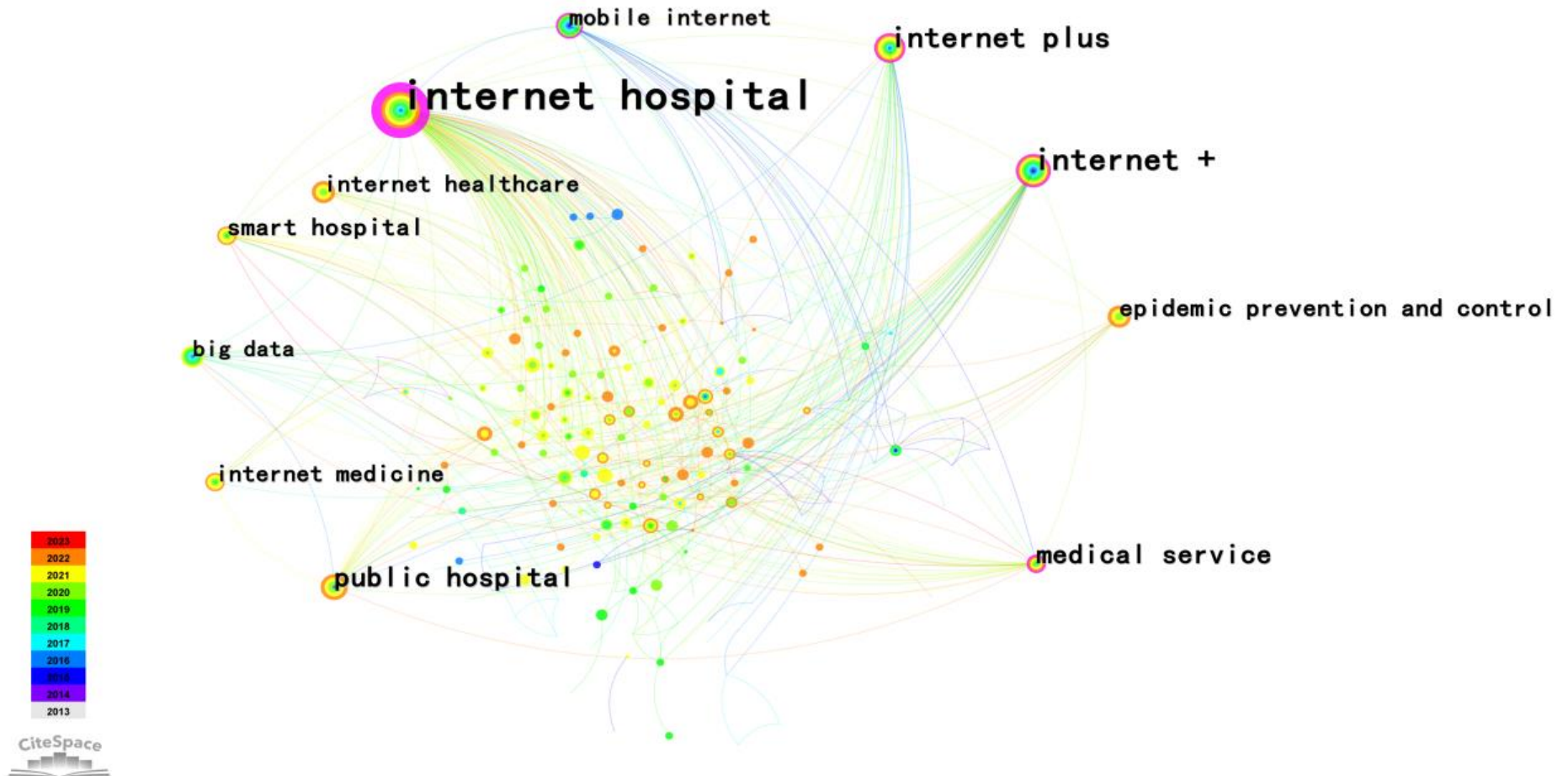


Figure 2.1 Keyword co-occurrence map in the research field of IH from 2013 to 2023

In this analysis, the method captured 331 keywords, with 14 having a frequency of at least 10, as Table 2.1 displays.

Table 2.1 Overview of high-frequency keywords in the research field of IH from 2013 to 2023

Label	Frequency	Centrality	Year
Internet hospital	225	0.84	2016
Internet+	53	0.19	2015
Internet plus	38	0.15	2016
Public hospital	31	0.06	2016
Medical service	27	0.11	2015
Smart hospital	20	0.05	2019
Epidemic prevention and control	18	0.01	2020
Mobile internet	17	0.12	2015
Internet medicine	17	0.01	2017
Internet healthcare	16	0.01	2020
Big data	15	0.05	2016
Internet medical	14	0.03	2016
Hospital management	13	0.06	2019
Internet diagnosis and treatment	10	0.01	2020
Internet medical service	10	0.03	2021

We can draw relevant conclusions based on the analysis of the keyword co-occurrence map. Firstly, the top ten high-frequency keywords in the research field of IH in China are Internet hospital, Internet +, Internet plus, public hospital, medical service, Innovative hospital, Epidemic prevention and control, Mobile internet, Internet medicine, and Internet healthcare. "Internet hospital" is the main subject of research, while "Internet +" and "Internet plus" are terms that describe the integration of the Internet with various industries. The remaining keywords represent the research directions favored by researchers. We can also see that public hospitals appear frequently in these research, indicating that public IH are a hot topic in the field of IH research. It is also in line with the current reality that the construction of IH in public hospitals is the mainstream in developing IH in China.

Secondly, looking at the year when the high-frequency keywords first appeared, they all emerged after 2015. It coincides with the emergence of the online hospital in Guangdong Province in 2014 and the establishment of the Wuzhen Internet Hospital in 2015. The research corresponds with the era characterized by the development of Internet technology and the innovation of the medical service industry. The appearance of keywords such as "epidemic prevention and control" aligns with the rapid development of IH in China during the COVID-19 pandemic. It also relates to scholars' increased attention and research on IH during this period.

By analyzing the most frequent keyword, "Internet hospital," we can also discern changes in research trends. In 2020, as IH was establishing itself on a large scale in China, many scholars concentrated their research on the institutional construction of IH and strengthening regulations to ensure medical safety (J. M. Shi et al., 2020; X. B. Wang & Li, 2020). For a nascent

phenomenon, establishing rules and norms for its development is a primary task. As IH further developed, researchers' focus and studies gradually shifted towards issues related to the operation of IH, such as operational challenges and patient privacy protection (Y. Liu et al., 2021; Y. Shi et al., 2021; Tao et al., 2021). During this period, after establishing the initial regulatory framework for IH, exploring how to operate and develop it better emerged as a worthwhile topic. In recent years, especially after the COVID-19 pandemic, the increasing acceptance of IH has sparked a growing interest in how it should evolve. Some scholars have begun investigating users' willingness to use IH (He et al., 2021; Yao et al., 2020; H. Yu et al., 2020).

2.1.4.3 Keyword clustering map

Keyword clustering analysis aims to identify research groups within a specific field of study. The smaller the sequence number of a group, the larger its scale and the more numerous its members. The earlier the average founding year of a group, the earlier its formation, which typically indicates a higher level of stability and maturity. This research employs the "Long Likelihood Ratio" method, generating a keyword data map by extracting selected keywords. With a Modularity Q value of 0.6023, where $Q > 0.3$, the clustering structure is significant. A Weighted Mean Silhouette S value of 0.8978 > 0.7 , suggests that the clustering structure is reliable. Figures 2.2 and 2.3 display the clustering maps.

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 Network: N=331, E=543 (Density=0.0099)
 Largest CC: 254 (76%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.6023
 Weighted Mean Silhouette S=0.8978
 Harmonic Mean(Q, S)=0.721

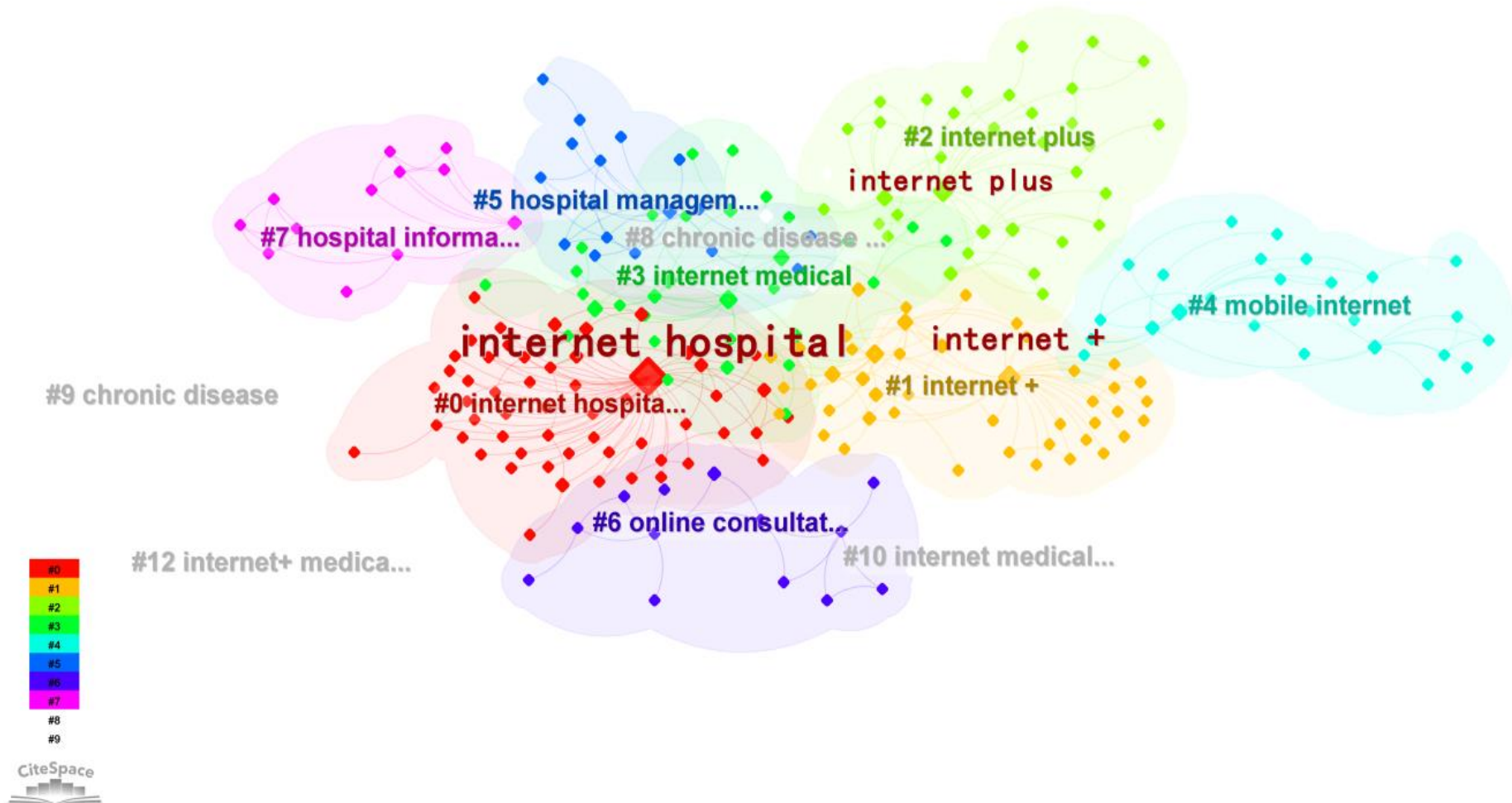


Figure 2.2 Keyword clustering map for IH research field, 2013 to 2023

CiteSpace, v. 6.1.R6 (64-bit) Basic
 February 10, 2023 at 10:29:12 AM CST
 CNKI: D:\CNKI\data
 Timespan: 2013-2023 (Slice Length=1)
 Selection Criteria: g-index (k=25), LRF=3.0, L/N=10, LBY=5, e=1.0
 Network: N=331, E=543 (Density=0.0099)
 Largest CC: 254 (76%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.6023
 Weighted Mean Silhouette S=0.8978
 Harmonic Mean(Q, S)=0.721

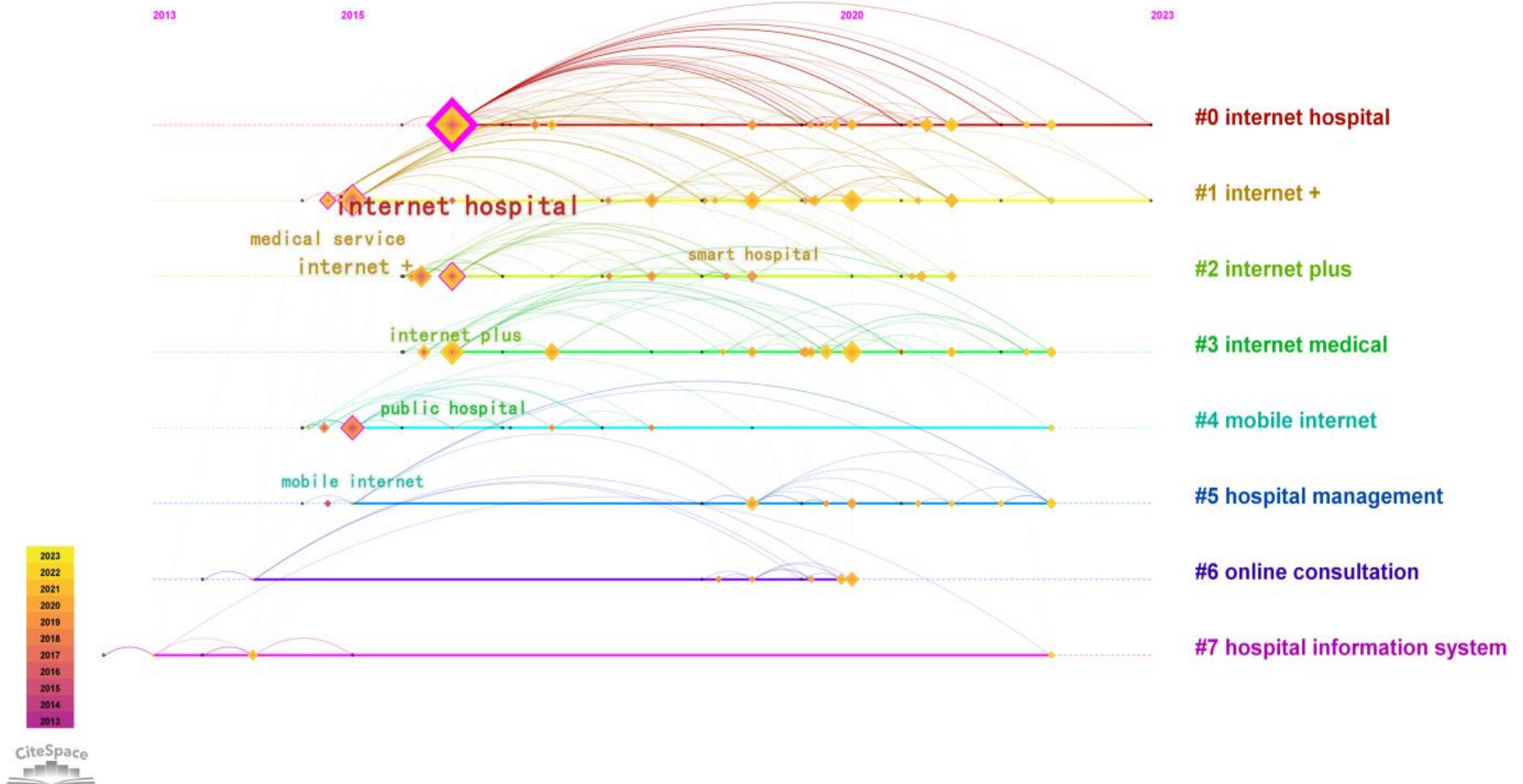


Figure 2.3 Timeline map of keyword clustering in the IH research field, 2013 to 2023

The top ten research clusters related to the topic are Internet hospital, Internet +, Internet plus, Internet medical, Mobile Internet, Hospital management, Online consultation, Hospital information system, Chronic disease management, and Chronic disease. The clustering tightness of the top ten groups exceeds 0.8, with the top five clusters having more than 20 members each, indicating that the clusters are stable and prosperous in members, as shown in Table 2.2.

Table 2.2 Overview of keyword clustering in the IH research field, 2013 to 2023

Cluster-ID	Size	Silhouette	Mean (Year)	Cluster
#0	55	0.859	2020	Internet hospital
#1	45	0.845	2019	Internet +
#2	35	0.889	2018	Internet plus
#3	31	0.878	2019	Internet medical
#4	26	0.957	2016	Mobile Internet
#5	17	0.904	2019	Hospital management
#6	13	0.968	2018	Online consultation
#7	12	0.995	2014	Hospital information system
#8	6	0.951	2020	Chronic disease management
#9	5	0.996	2017	Chronic disease
#10	5	0.997	2019	Internet medical service
#11	4	0.996	2016	Internet+ medical

Representative research clusters, such as #0 Internet hospital, include keywords like "Internet hospital", "Internet medical treatment", "Electronic prescription", and "Operation mode". Through these keywords, we can see that in the research on IH, scholars have focused on the fundamental business function of IH, which is internet-based medical consultation. At the same time, scholars have also paid attention to the implementation of Internet medical treatment, such as electronic prescriptions. Additionally, some have focused on the operational models of IH. Pei et al. (2021) researched the operational model of government-led IH, discussing how these hospitals work to improve operational efficiency and promote data sharing under this model. Wu et al. (2021) studied 39 Internet medical service institutions, exploring the operational models of Internet medical services, comparing the differences in operational models, and presenting insights into the operation of IH. In the research on IH, the operational models of IH have gradually gained scholars' interest. In the actual operation of IH, the volume of medical services provided, the quality of medical services, and the research on operational models are all inseparable from the research on and attention to medical personnel.

Cluster #5, Hospital management, is also a very representative cluster. This cluster reflects scholars' attention to the management issues of IH. This cluster includes keywords such as "Hospital management", "post-epidemic era", "Service Quality model", "Quality evaluation", and "Medical administration". Through these keywords, scholars focus on improving the quality of diagnosis and treatment in IH. It also includes the question of how IH should develop

after the end of the pandemic. As pointed out in the research findings of Hou et al. (2022), strengthening training, supervision, and incentives is a vital way to improve the quality of Internet medical consultation services. Additionally, Ding et al. (2022) explored how to complete the evaluation and improvement of internet medical consultation quality by constructing indicators from the perspective of building an Internet medical service quality evaluation system. Scholars have also used different quality management tools, such as the SERVQUAL model, to discuss ways to improve quality and quality management methods in IH (Ding et al., 2022; Y. Wu et al., 2022; C. H. Yao et al., 2022).

2.2 Stakeholder theory

Traditional organizations have always regarded shareholders as the most critical factor in corporate development, believing that the core of organizational management lies in continuously increasing the returns and wealth of shareholders. As a result, companies often pursue higher profits at the expense of the interests of society and stakeholders. As a theoretical approach to studying organizational management, stakeholder theory emphasizes that organizations should consider stakeholders' interests to ensure long-term sustainable development. The core idea of stakeholder theory is that organizations should consider stakeholders' interests to ensure their long-term sustainable development (Freeman, 1984).

2.2.1 Defining stakeholders

In the early 20th century, the primary focus of corporate management was on shareholders, those individuals or institutions that invested in a company and expected a financial return. This shareholder-centric theory emphasized that the primary purpose of a business was to maximize value for its shareholders. However, this theory has come under increasing scrutiny over time, especially when considering the impact of corporate actions on other groups. Fu and Zhao (2006) noted that questioning the shareholder-centric view and innovating upon it formed the basis for developing stakeholder theory. Laplume et al. (2008) pointed out that stakeholder theory initially took root in strategic management, evolved into organizational theory and business ethics, and later expanded into sustainable development.

In 1927, General Electric first mentioned the concept of stakeholders in an inaugural speech, marking an expansion in the understanding of the scope of corporate responsibility (J. H. Liu, 1999). Subsequently, the Stanford Research Institute in 1963 further emphasized the importance of stakeholders, describing them as support groups upon which an organization's survival

depended. Furthermore, Ansoff (1965) used the term "stakeholders" in economics and proposed the view that the interests of all parties should be balanced when formulating corporate objectives.

Since the 1980s, stakeholder theory has become a hot research topic in the academic community, generating a vast body of literature. Although scholars have yet to form a unified view on the definition and concept of stakeholders, many widely accept Freeman's definition. In Freeman's (1984) definition, stakeholders include not only individuals and groups that directly influence organizational behaviour and the achievement of objectives but also those who are affected by the realization of organizational goals and the processes involved. This definition expanded the scope of stakeholders to include not just the direct economic transaction parties but also a broader group that might be indirectly affected by corporate actions. Freeman's book "Strategic Management: A Stakeholder Approach" further elaborated on the application of stakeholder theory, proposing that corporations should consider the interests of all stakeholders, not just shareholders when formulating strategies. This approach promoted corporate social responsibility and ethical behaviour, emphasizing that the role of corporations in society is not merely as economic entities but also includes responsibilities to society and the environment (Freeman, 1984).

The rise of globalization and social responsibility has expanded the application of stakeholder theory to a broader range of fields, including environmental protection, social justice, and corporate governance. Businesses have begun to realize that establishing good relationships with stakeholders is crucial for long-term success, including economic prosperity and sustainable development on social and environmental levels. In modern business practices, the application of stakeholder theory has transcended traditional corporate boundaries, involving non-profit organizations, government agencies, and international bodies. These entities are all striving to balance the needs of different stakeholders in order to achieve broader societal goals. The development and application of stakeholder theory reflect the growing global concern for corporate social responsibility and sustainable development.

2.2.2 Classification of stakeholders

Through the literature review, we have found that due to different research purposes or perspectives, various scholars have proposed multiple methods of classifying stakeholders.

2.2.2.1 Classification by importance

Clarkson (1995) argues that stakeholder theory provides a robust framework for understanding

the complex relationships between a corporation and the various parties in its environment. According to Clarkson's Classification, Primary Stakeholders are the core groups indispensable to the operation of a business, with whom the business has direct and ongoing transactional relationships. Shareholders and investors provide the necessary financial support to the business and are directly interested in the company's financial performance related to their investment returns. Employees are the cornerstone of the business's daily operations; their labour directly translates into the company's products and services, which are crucial for its long-term success. Customers also fall into this category, directly supporting the business's revenue by purchasing products or services. Suppliers provide essential raw materials or components, directly impacting production and cost control. These groups typically possess higher bargaining power and can significantly influence business strategy.

In contrast, Secondary Stakeholders should have their influence considered while not having a direct and decisive role in a company's daily operations and long-term survival. These groups include communities, governments, media, non-governmental organizations (NGO), and the general public. For instance, communities may be concerned about a company's environmental impact, while governments can affect corporate operations through legislation and regulation. Media coverage can shape public perceptions of a company, and NGO may pressure a company regarding specific issues. Although the influence of these groups may be indirect, in some instances, they can significantly impact a company through public mobilization, policy advocacy, or legal action.

When formulating strategies and making daily decisions, corporate managers must balance the needs and expectations of both stakeholders. Attention to Primary Stakeholders typically focuses on direct economic transactions and value creation, while interactions with Secondary Stakeholders often involve corporate social responsibility, reputation management, and long-term sustainability. For example, a company might invest in employee training and development to enhance production efficiency and employee satisfaction while also implementing environmental protection measures to respond to the expectations of communities and environmental organizations.

In the era of globalization and the Internet, the role of secondary stakeholders is increasingly significant. The speed and reach of information dissemination are unprecedented, enabling them to mobilize and exert oversight and influence on corporate behaviour quickly. Therefore, while pursuing profits, modern enterprises must also pay greater attention to their social and environmental impacts to maintain their long-term legitimacy and competitiveness.

Clarkson's (1995) stakeholder classification provides a valuable perspective that helps us

understand the dynamic relationships between a corporation and its broad range of stakeholders. By identifying and prioritizing the needs and expectations of these different groups, corporations can manage their external relationships more effectively, achieving success in a complex and ever-changing business environment.

2.2.2.2 Classification by attributes

The stakeholder classification model proposed by Mitchell et al. (1997) offers a robust analytical tool for understanding and managing the relationships between an organization and its stakeholders. This model determines their influence on the organization by assessing three attributes of stakeholders—legitimacy, power, and urgency. Below is an expansion and in-depth explanation of this model:

1. Definitive Stakeholders

These stakeholders possess all three attributes of legitimacy, power, and urgency and, therefore, have a decisive impact on the corporation. Legitimacy refers to the legitimate rights or claims of the stakeholders, power refers to their influence over corporate decisions, and urgency indicates that their needs or issues require immediate attention by the corporation. Shareholders, employees, and consumers are typical examples of such stakeholders. Shareholders have investment stakes, employees are crucial to the corporation's operations, and consumers' purchasing behaviour directly affects the corporation's revenue. The corporation must prioritize the needs and expectations of these stakeholders, as they are vital to the business's success.

2. Expectant Stakeholders

This category of stakeholders possesses two attributes: having a close but not decisive connection with the corporation. For example, suppliers may have legitimacy and urgency. However, they may need more power over corporate decisions, whereas government agencies may have legitimacy and power, but their demands may not be urgent. Expectant stakeholders significantly influence the corporation, but not as much as definitive stakeholders. The corporation needs to closely monitor the actions and needs of these stakeholders to maintain good cooperative relationships and corporate reputation.

3. Latent Stakeholders

Stakeholders with only one attribute are considered latent stakeholders. They may have certain expectations of the corporation, but their influence could be more substantial due to insufficient power or urgency. For example, local communities may have legitimate concerns about the corporation's environmental impact, but their power could be higher if they can

pressure the corporation. Similarly, the media may have urgent concerns about the corporation, but their influence is limited if they lack legal or moral legitimacy. The corporation might monitor these stakeholders to prevent their influence from growing, which could transform them into expectant or definitive stakeholders.

When formulating strategies and making decisions, corporations can utilize the model by Mitchell et al. (1997) to identify and prioritize different types of stakeholders. This model helps the corporation allocate resources more effectively and aids in predicting and managing potential risks and opportunities. Furthermore, corporations can use this model to evaluate and improve their stakeholder communication and engagement strategies, ensuring that the needs of all stakeholders are appropriately considered and addressed.

Corporations must continuously assess and adjust their stakeholder management strategies in the modern business environment, where stakeholders' expectations and needs constantly evolve. Mitchell et al.'s (1997) model provides a dynamic framework that helps corporations remain agile and adaptive in a complex and changing environment. By understanding and addressing stakeholders' different attributes, corporations can better build sustainable competitive advantages and find a balance between social responsibility and economic success.

2.2.2.3 Classification according to the social dimension

Building upon the work of Clarkson (1995), Wheeler and Sillanpaa (1998) introduced a social dimension, reflecting the growing importance of social responsibility in corporate strategy. Their Classification considers the importance of stakeholders to the corporation and their position within the social structure. Primary social stakeholders may include communities and labour organizations directly affected by corporate activities, while secondary social stakeholders may encompass environmental groups and NGO. Primary non-social stakeholders, such as shareholders and customers, typically transact directly with the corporation. In contrast, secondary non-social stakeholders might include industry analysts and the media.

The classification methods proposed by different scholars reflect their varying interpretations of stakeholder importance. For example, the distinction between internal and external classifications helps us differentiate between the core participants in a company's internal operations and the external groups that influence corporate decision-making. The distinction between primary stakeholders and peripheral stakeholders assists companies in identifying which groups are critical to their strategy and operations and which have a lesser impact.

The classification method of Savage et al. (1991) focuses on stakeholders' attitudes and

behaviours towards corporate strategy. Supportive stakeholders are typically corporate partners, marginal stakeholders may be less concerned with corporate activities, adversarial stakeholders may criticize certain corporate decisions, and mixed-blessing stakeholders may exhibit various attitudes in different situations. On the other hand, Charkham's (1996) classification emphasizes the legal and economic ties between stakeholders and the corporation. Contractual stakeholders, such as employees, suppliers, and customers, have direct economic transactions and contractual relationships with the corporation. Public stakeholders like local communities and governments may not engage in direct economic transactions.

Nonetheless, the well-being of these stakeholders intertwines closely with corporate activities. These different classification methods provide corporations with a multidimensional framework to identify and manage their stakeholders. Corporations can use these frameworks to develop more refined communication strategies. It ensures that they consider the concerns of all stakeholders appropriately. Moreover, these classification methods also help corporations identify key stakeholder groups when formulating social responsibility and sustainability strategies.

In summary, the various classification methods enrich our understanding of stakeholders and provide practical tools for corporations to manage relationships with stakeholders more effectively. These theoretical foundations are crucial for subsequent research, as they offer a framework for analyzing and addressing the complex interactions between corporations and stakeholders. As the business environment evolves, these classification methods may develop and adapt to new challenges.

2.2.3 Doctors as stakeholders in IH

Research on stakeholders suggests that corporations should not solely pursue the maximization of shareholder interests but also consider the needs of stakeholders (Freeman & Reed, 1983; Friedman & Miles, 2002). Organizations should consider stakeholders' interests to ensure the organization's long-term sustainability. Based on the study and organization of the literature, it is evident from the various classifications and identifications of stakeholders that doctors are stakeholders in IH.

According to the stakeholder classification by Mitchell et al. (1997), doctors possess a high degree of legitimacy within IH. It is because doctors provide professional medical services on these platforms, which are foundational to the operation of IH. Simultaneously, doctors hold authority in the decision-making process of treatment, as their professional judgment is critical to the outcome of the treatment. Urgency is also reflected in doctors' work, mainly when dealing

with emergencies. Therefore, identified through legitimacy, power and urgency, doctors can be considered as definitive stakeholders in IH.

According to Wheeler and Sillanpaa (1998), in the classification of stakeholders, doctors are primary social stakeholders because they are directly involved in patients' health and well-being, one of the most critical issues of public concern. Their work and decisions have a direct and profound impact on society.

From the perspective of Freeman (1984), who divides stakeholders into internal and external stakeholders, doctors are identified as internal stakeholders of IH, as their work is directly related to the IH operation and quality of service.

According to Savage et al.'s (1991) classification method, one should consider doctors as supportive stakeholders because they provide medical services online and support the operation and development of IH.

Based on Charkham's (1996) classification criteria, one should consider doctors as contractual stakeholders, as they must register for medical practice with IH and enter into employment relationships or contracts of other forms of cooperation.

Drawing on the study of past academic literature, scholars have researched the stakeholders of telemedicine. Their research also indicates that doctors are stakeholders in telemedicine. Kim and Choi (2021) believe South Korea has an excellent foundation in information and communication technology. However, resistance from stakeholders and legal restrictions have hindered the development of telemedicine. They analyzed the telemedicine stakeholders in South Korea and found that doctors are among these stakeholders. The study by Walker et al. (2023) points out that during the COVID-19 pandemic, the utilization of telemedicine for HIV care significantly increased. They considered the impact of different stakeholders on telemedicine through their research. Their study identifies clinical doctors as stakeholders in telemedicine.

By studying stakeholder literature and applying the stakeholder classification and identification methods, we can conclude that doctors are stakeholders of IH. Additionally, related research indicates that doctors are stakeholders in IH. Therefore, this study considers doctors' perspectives when investigating their acceptance of IH, which can influence the development of these institutions. In the following sections, we will also conduct a literature review and analysis of the degree to which doctors accept IH and telemedicine.

2.3 Current research on doctors' acceptance of IH/telemedicine

As stakeholders of IH, doctors' intentions to use these facilities are crucial for the healthy and sustainable development of IH. IH and telemedicine are similar concepts; therefore, this section will provide an overview of the current research on doctors' use of IH/telemedicine.

2.3.1 Current research on doctors' use of telemedicine

By studying telemedicine-related literature, researchers have shown considerable interest in the factors influencing patients' willingness to use telemedicine. However, researchers have conducted relatively less research from the perspective of doctors. Gomez et al. (2021) conducted semi-structured interviews with primary healthcare physicians in Southern California to understand medical professionals' views on telemedicine during the COVID-19 pandemic. The interviews revealed that doctors believe telemedicine has increased patients' opportunities to access medical services. The rate of missed appointments was significantly lower for telemedicine patients than for those attending in-person visits. However, telemedicine was less convenient for people without smartphones and older adults. Doctors felt telemedicine could enhance home care's effectiveness for patients, but it could not perform physical examinations on patients. With telemedicine, doctors found it more convenient to refuse some patient requests than in-person visits, and they noticed that the consultation times were shorter than traditional appointments. The study results indicate that doctors have a positive attitude towards telemedicine.

Nguyen et al. (2020) retrospectively analyzed relevant research literature. They described factors affecting the satisfaction with telemedicine use from doctors' and patients' perspectives. Their study suggests that involving doctors in the design and implementation process of the telemedicine system could increase their satisfaction with telemedicine. High patient satisfaction with telemedicine also tends to enhance the satisfaction of medical professionals with telemedicine. Providing necessary training for doctors in telemedicine also impacts their satisfaction levels. Indeed, J. C. Huang (2013) also believed that doctors' participation in the design process of telemedicine systems could increase their satisfaction with telemedicine.

Additionally, patient satisfaction could lead to greater satisfaction among medical staff. From another perspective, LeRouge et al. (2012) argued that joint training for medical staff could make them more willing to use telemedicine. Furthermore, Broens et al. (2007) suggested that effective organization, reliable technology, adequate financial support, and supportive policies and regulations could make telemedicine more acceptable to medical professionals.

Idriss et al. (2022) conducted a study on the perceptions and attitudes of doctors in Riyadh towards the use of telemedicine during the COVID-19 pandemic. The study also explored the relationship between telemedicine and physician burnout. A survey of 500 doctors yielded 362 valid responses. Data analysis revealed that 70% of respondents believe telemedicine is cost-effective, and doctors generally have a positive attitude towards telemedicine. Gillman-Wells et al. (2021) researched the use of telemedicine among plastic surgeons in the UK during the COVID-19 era. The findings indicate that 70% of the doctors were receptive to telemedicine.

Srinivasan et al. (2020) conducted qualitative interviews with key stakeholders to study the perceptions of acceptability and effectiveness of telemedicine at Stanford Health Care. Telemedicine enables doctors to provide medical services to patients regardless of location, highlighting the ease of use of telemedicine technology. The study also indicated that doctors believe telemedicine is sustainable. Malouff et al. (2021) suggest that telemedicine can reduce travel time for patient appointments. Furthermore, telemedicine can afford doctors more adequate sleep and ensure they have more time to care for their families and participate in social activities, effectively helping to prevent professional burnout among physicians.

Over the past few decades, patient care has gradually shifted towards digitalization. Researchers used qualitative methods to conduct semi-structured interviews with physicians. The results indicated that doctors view digital virtual consultations as a complement to face-to-face appointments and an effective tool for reducing the distance and time barriers for patient visits. However, in advancing digital virtual consultations, it is essential to consider the impact of this convenience on physicians' work-life balance. Further strengthening doctor training is needed (Zammit et al., 2023).

2.3.2 Current research on doctors' use of IH

He et al. (2021) conducted a study to explore the willingness of medical staff to use IH and the factors influencing their use. The research structured the study around three dimensions: medical personnel's perception of IH, current internet medical consultation usage, and willingness to use IH. After distributing 279 questionnaires and analyzing the data, the study concluded that medical personnel have concerns and doubts about the effectiveness and accuracy of IH in resolving medical issues. The results also indicated that medical staff worry that Internet medical services could increase their workload. Additionally, medical personnel believe that the operation of IH needs to be more convenient and that they need more spare energy or time to learn. Therefore, the authors suggested that IH should strengthen policy support, explore remuneration incentive mechanisms, and simplify operations. In their study,

Yao et al. (2022) aimed to analyze the barriers doctors within a Shenzhen medical group face when promoting IH services. To this end, they conducted in-depth interviews with 24 medical staff members from a medical group in Shenzhen. The qualitative research concluded that doctors need more clarity regarding online and offline services, with restrictions on online consultation fees affecting the performance income of medical staff. Doctors also commonly worry about medical safety and disputes arising from online consultations. The authors also analyzed technical factors, concluding that system operation procedures, information interoperability, and system functionality affect doctors' acceptance of IH.

H. Yu et al. (2020) conducted a study on the willingness of medical staff in Shanghai to provide internet-based medical consultation services and the factors influencing this willingness. The study surveyed medical personnel from hospitals and community health service centers across 16 districts in Shanghai. The results showed that 64.2% of medical staff supported the development of internet-based medical consultations in the city, 87.3% explicitly supported their medical institutions in providing internet-based medical services, and 89.3% supported their departments in carrying out such services. Factors such as the medical staff's gender, age, and the registration level of their medical institutions affected their participation in internet-based medical services. K. Wu et al. (2020) researched the satisfaction of medical staff with participating in online consultations. They conducted a quantitative study using a questionnaire method. The study found that factors such as the frequency of service, average time per service, alleviation of patient anxiety during consultations, doctor-patient communication, and doctors' self-evaluation of practice risk affected the satisfaction of medical staff with IH. Based on the findings, the authors suggested establishing effective incentive mechanisms, managing consultation time, and expanding internet-based doctor-patient communication models to promote the development of IH.

J. Liu et al. (2021) studied the factors affecting the perception and demand of medical staff towards IH at Hunan Provincial People's Hospital. The results indicated that the age of medical staff and their level of awareness about IH could influence the development of IH. Moreover, Qi et al. (2020) analyzed the current state and influencing factors of medical staff using Internet medical services. The research analyzed three dimensions: the current usage of Internet medical functions by medical staff, their satisfaction with various Internet functions, and their willingness to use Internet medical services. The findings suggested that Internet medical services support medical staff in providing medical services and have extended the range of services to some extent. However, doctor-patient communication, technological maturity, risks, and the policy environment have reduced usage.

Chen et al. (2019) integrated expectancy theory with the Bagozzi, Dholakia, and Basuroy model to study doctors' motivations and behavioural intentions in online health platforms. Their research indicated that doctors are driven not only by external rewards and images but also by intrinsic motivations such as a sense of self-worth. The study also noted that consultation time on online health platforms is essential for doctors' behavioural intentions.

In summary, scholars have studied medical staff's use of IH/telemedicine. These studies are more exploratory, seeking to understand the perspectives of medical staff on telemedicine/IH through interviews or to survey the current state of use of IH/telemedicine among medical staff through questionnaires. Based on the results of interviews and current state surveys, they explore related influencing factors. However, the essence of IH lies in transforming the mode of medical services through informatization and digitalization in the process of digital transformation. More research needs to be conducted from the technology acceptance perspective, analyzing medical staff's acceptance of IH. This study will be based on UTAUT model to explain the interrelationships between relevant influencing factors and doctors' use of IH.

2.4 Theories related to technology acceptance

With the rapid development of computers and information technology, they have become an indispensable part of modern society. This ubiquity has sparked in-depth academic research into how users accept and use these technologies. Since the late 20th century, researchers have devoted considerable effort to exploring the various factors that influence technology acceptance and usage. These studies focus on the technology's characteristics and users' psychological attitudes, social environment, cultural background, and other external conditions. Numerous scholars have approached this from different perspectives, employing various methods and continuously adjusting and optimizing models to explain better and predict people's intentions and behaviours regarding technology acceptance (Taylor & Todd, 1995).

Among these theories and models, the Theory of Reasoned Action (TRA) is one of the earliest. It posits that an individual's behavioural intentions determine their behaviour. Attitudes and subjective norms shape these behavioural intentions. Subsequently, the Theory of Planned Behaviour (TPB) added the concept of perceived behavioural control to the foundation of TRA to account for situations where individuals may lack complete volitional control. The Technology Acceptance Model (TAM) focuses more specifically on the context of technology use, proposing two key factors: perceived usefulness and perceived ease of use, which are

considered the primary drivers influencing user acceptance and use of technology. TAM underwent several revisions and expansions as research progressed to include more influencing factors and contextual variables. The UTAUT emerged, integrating key elements from the theories above, and empirical research validated it. The UTAUT model proposes four core constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions, and considers the role of moderating variables such as gender, age, experience, and voluntariness.

This section will provide a detailed overview of the theories above, analyzing their core concepts, interrelationships, and their application in empirical research. Additionally, we will explore the reasons for choosing the UTAUT as the theoretical framework for this study. The rationale for selecting UTAUT lies in its comprehensiveness and applicability; it integrates the strengths of previous models and has demonstrated high explanatory and predictive power in multiple studies. By employing UTAUT, this study offers a detailed perspective on understanding and predicting user acceptance and usage behaviour towards emerging technologies.

2.4.1 Theory of reasoned action

The Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen in 1975 and is a theoretical framework widely applied in social psychology and behavioural sciences. The core premise of TRA holds that individuals plan and intend their behaviour rather than it occurring randomly or unconsciously. This theory attempts to reveal how people form attitudes towards behaviours based on their evaluation of the outcomes of a particular action, their perception of social expectations, and, ultimately, how they form behavioural intentions (Fishbein & Ajzen, 1975).

According to the TRA, behavioural intention is the direct precursor to behaviour, representing an individual's subjective probability of whether they will perform a specific action. Two main factors, attitudes and subjective norms, influence behavioural intention itself. Attitudes reflect an individual's evaluation of specific behaviour, that is, the extent to which they believe performing the behaviour is good or bad. The individual's beliefs about the outcomes of the behaviour and their valuation of these outcomes form the basis of this evaluation. For example, in the context of technology acceptance, if a person believes that using a particular technology will improve their work efficiency and values this efficiency gain highly, their attitude towards using the technology may be optimistic.

Subjective norms involve an individual's perception of the expectations of significant others

or social groups and their motivation to comply. Suppose a person believes that most people who are important to them think they should perform a specific action and wishes to fulfil these expectations. In that case, the influence of subjective norms on behavioural intention is positive.

Within the framework of TRA, attitudes and subjective norms interact through behavioural intentions, ultimately leading to a specific behaviour. This model provides a structured approach to understanding individual behaviour and offers researchers a tool for assessing and predicting behaviour.

The variables in the TRA model are explained as follows:

1. Attitude is considered one of the critical determinants of behavioural intention. Precisely, attitude reflects an individual's emotional orientation towards a particular behaviour, which can be positive or negative, and is based on the individual's evaluation of the outcomes of the behaviour (Fishbein & Ajzen, 2010). For example, suppose a person believes healthy eating will lead to good health outcomes. In that case, they may form a positive attitude towards healthy eating, increasing their intention to engage in healthy eating behaviour.

2. Subjective Norms are also one of the critical determinants of behavioural intention. They focus on how individuals perceive the views of those critical to them—such as family members, friends, and peers—regarding a particular behaviour and how these perceptions influence the individual's behavioural performance (Fishbein, 1976). If a person believes that their close friends and family expect them not to smoke, then this perceived social pressure may prompt them to form an intention to refrain from smoking.

3. Behavioural intention is the link between attitudes and behaviour and is the direct precursor to predicting whether an individual will perform a specific action. The individual's attitude and the subjective norms they perceive shape their behavioural intention. When a person has a positive attitude towards behaviour and perceives that significant others support this behaviour, the behavioural intention they form is likely to be stronger.

4. Behaviour is an individual's observable action to achieve a specific goal in a given context. These actions can be physical movements, decision-making processes, or verbal expressions. For instance, a person may cycle to work instead of driving to reduce environmental pollution; this choice manifests in behaviour.

The TRA provides a robust framework for understanding and predicting individual behaviour based on two critical psychological variables: attitude and subjective norm. According to TRA, an individual's attitude is their evaluation of specific behaviour outcomes. At the same time, the subjective norm is the individual's perception of social pressure and willingness to comply. When both of these factors are positive, the individual's behavioural

intention is likely to be stronger, thereby increasing the likelihood of the individual engaging in the specific behaviour. Conversely, if these factors are negative, the individual's behavioural intention will be weaker, thus decreasing the likelihood of undertaking the specific Behaviour (Fishbein & Ajzen, 1975).

Numerous scholars have garnered the attention of the universality and applicability of TRA and have applied it across various fields. For instance, the study by Yadav et al. (2022) utilized TRA to explore consumer behaviour towards purchasing recycled shoes. The findings indicated that consumers' attitudes and perception of societal expectations jointly influenced their purchase intentions, directly affecting their buying behaviour. They suggest that TRA can be effectively used to predict and explain consumer purchasing decisions. In the health domain, Wang et al. (2022) employed TRA to study the behaviour of social support exchange in online health communities. The research found that individuals' attitudes and perceptions of social norms positively influenced their willingness to disclose personal health information within the community. It demonstrates that TRA can aid in understanding individual interactions and information-sharing behaviours in online settings. With increasing environmental and health consciousness, Roh et al. (2022) applied TRA to study the consumption behaviour of organic foods. The results showed that TRA is an effective tool for predicting organic food consumption behaviour, with attitudes and subjective norms playing critical roles in the process. Rad et al. (2022) used TRA to investigate the intention to vaccinate against COVID-19 in the public health sector. The study across four provinces in southern Iran revealed that attitudes and subjective norms were significant predictors of vaccination intentions, providing important psychological insights for vaccination promotion strategies. Additionally, Singh and Ravi (2022) combined TRA with the Technology Acceptance Model (TAM) to study the use of electronic health platforms. Their research, which collected 224 samples, found that attitude fully mediated between perceived usefulness and intention to use, further substantiating the importance of attitude in forming technology acceptance behaviours.

Although TRA has been widely applied in academia and proven to have sound predictive effects across multiple domains, its fundamental premise is that individual behaviour is rational and under the control of willpower. It means that TRA can effectively predict and explain their behaviour only when individuals are rational; logic and information processing form the basis of their actions. However, when individual behaviour is irrational, or their willpower is not in control, such as when they are under the influence of strong emotions or habitual behaviours, the predictive capability of TRA may be limited.

Therefore, although TRA is a powerful theoretical tool, its application must consider the

complexity and diversity of individual behaviour. Future research should explore integrating TRA with other theories to explain behaviours that rationality does not entirely drive more comprehensively. Additionally, researchers are continually attempting to overcome the limitations of TRA by introducing new variables or constructing new theoretical models to understand and predict human behaviour more accurately.

2.4.2 Theory of planned behaviour

The Theory of Planned Behaviour (TPB) is essential in psychology. First introduced by Ajzen in his 1985 publication (Ajzen, 1985), it has matured over the subsequent years through empirical research and theoretical discussion. In his 1991 research, "The Theory of Planned Behaviour," Ajzen elaborated on various aspects of the theory, marking the completion and systematization of the TPB (Ajzen, 1991).

The introduction of the TPB aimed to address the limitations of its predecessor, the TRA, in predicting behaviour. TRA posits that an individual's behavioural intentions primarily determine their behaviour, while attitudes and subjective norms influence these intentions. However, TRA needs to consider the control factors individuals might encounter when executing their intentions adequately. Therefore, Ajzen introduced the "Perceived Behavioural Control" concept to enhance the ability to predict actual behaviour.

Perceived behavioural control refers to an individual's perception of their ability to perform a specific behaviour, involving an assessment of the availability of necessary resources and opportunities. When individuals perceive that they can control their actions, they are more likely to form a solid intention to behave in a certain way, even in the face of obstacles, and ultimately carry out that behaviour. Ajzen (1991) proposed two hypothetical scenarios to explain how perceived behavioural control can influence behaviour:

In the first scenario, when individuals believe they lack the resources or opportunities to perform a specific behaviour, the influence of their attitudes and subjective norms on behavioural intention may be weakened. In this case, perceived behavioural control may become a key factor affecting behavioural intention, indirectly influencing actual behaviour. Here, perceived behavioural control acts as a moderator, allowing individuals to take action even when attitudes and subjective norms are weak.

In the second scenario, when the predicted behaviour is not entirely voluntary or when an individual's control over the behaviour is limited, perceived behavioural control may have a direct relationship with the behaviour itself. It means that even if the intention to perform the behaviour is not firm, individuals may still carry out the behaviour if they perceive high control

over it. In this case, perceived behavioural control affects behavioural intention and may also directly influence behaviour.

The TPB model delineates the relationships between attitudes, subjective norms, perceived behavioural control, and behavioural intention and how these factors collectively affect the final behaviour. The variables in the model are explained as follows:

1. Attitude refers to an individual's evaluation of a particular behaviour, encompassing excellent or bad, positive or negative aspects. Personal experiences, moral standards, and cultural background may serve as the foundation for this evaluation. Attitudes are formed by assessing the outcomes of behaviour and its benefits while considering the importance of these benefits to personal goals.

2. Subjective norms refer to an individual's perception of other people's attitudes and expectations regarding a specific behaviour. These expectations may come from family, friends, society, or the media and represent the values and behavioural norms within the individual's social environment. Subjective norms are formed by considering the attitudes and expectations of others in one's environment.

3. Perceived behavioural control refers to an individual's perception of their ability to control behaviour. It includes the individual's judgment of the difficulty level of performing the behaviour and the confidence in their ability to overcome the obstacles faced in executing it and assessing the operability of behaviour along with one's skills and resources forms perceived behavioral control.

4. Behavioural Intention refers to the degree of an individual's willingness and planning towards a specific behaviour, that is, the readiness and intention to perform a specific action. Behavioural Intention is the first step in transforming a behaviour from thought to action and is a prerequisite for carrying out a specific behaviour.

5. Behaviour refers to an individual's actual actions, which are the external manifestations of behavioural intention. TPB posits that Behavioural Intention is the direct antecedent of behaviour.

TPB is an essential theoretical psychological framework for predicting and explaining human behaviour. It inherits the core elements of TRA and significantly enhances the predictive power for behaviour by introducing the concept of perceived behavioural control. Perceived behavioural control assesses a behavioural operability and evaluates its skills and resources. Researchers across various fields apply this theory extensively, and here are some specific application examples. Researchers across various fields have widely applied this theory, and here are some specific application examples.

Gibson et al. (2021) utilized TPB to predict Americans' behavioural intentions to protect freshwater resources. The study analyzed data from 1,049 questionnaires and found that attitudes, subjective norms, and perceived behavioural control significantly predicted participants' intentions to conserve water. It indicates that TPB can be effectively applied to predict environmental protection behaviours. Also, Cheshire et al. (2021) applied TPB to predict individuals' intentions to use alternative dispute resolution. The findings supported the application of TPB in the legal field, demonstrating the theory's effectiveness in predicting individuals' choices of non-litigious dispute resolution methods.

TPB has also been applied to studies on college students' texting while driving behaviours. Bazargan-Hejazi et al. (2017) found that TPB could explain approximately 47% of the behavioural intention to text while driving among college students, highlighting the potential application of TPB in studying traffic safety behaviours. Meanwhile, Rana et al. (2019) utilized TPB to investigate students' cyberloafing behaviours in the classroom. Cyberloafing refers to students using the internet for non-academic activities during class time. The study results indicated that attitudes, subjective norms, and perceived behavioural control significantly influenced students' intentions to cyberloaf, providing educators with a new perspective for understanding and intervening in students' classroom attention diversion.

Despite TPB's significant achievements in predicting and explaining behaviour, the theory has some limitations. In particular, TPB needs to consider the impact of situational and emotional factors sufficiently. For example, factors such as socio-cultural background, economic environment, policy regulations, and emotional state can all influence an individual's behavioural intentions and behaviour. However, the framework of TPB only partially represents these elements. In practical applications, this may lead to the theory needing more substantial explanatory power in specific contexts.

To overcome these limitations, researchers have proposed several extended models that incorporate variables such as emotional factors, moral norms, and past behaviour to improve the predictive accuracy of TPB in different contexts. Additionally, cross-cultural studies have shown that specific components of the TPB may exert varying degrees of influence in different cultural contexts. These findings suggest that researchers should consider cultural adaptability when applying TPB. Through these efforts, TPB can become a more comprehensive and flexible tool to accommodate the diverse application needs across different fields.

2.4.3 Technology acceptance model

The Technology Acceptance Model (TAM) is one of the most influential models in information

systems. It provides a theoretical framework for understanding and predicting individuals' acceptance of new technologies. F. D. Davis (1989) introduced this model in his seminal work 1989, aiming to explain how users accept and use computer technology. The core of TAM lies in two central cognitive beliefs: Perceived Ease of Use and Perceived Usefulness.

Perceived ease of use refers to the user's subjective perception of a specific technology's simplicity and stress-free nature. If users find a technological product or service easy to understand, learn, and operate, they are more likely to accept and use that technology. On the other hand, perceived usefulness is the user's subjective evaluation of how much a technology can enhance work efficiency or improve job performance. When users believe that a particular technology can help them complete tasks faster and more effectively, they are likelier to adopt that technology.

F. D. Davis's (1989) research indicated that these factors significantly predict users' technology acceptance behaviour. Perceived usefulness is the strongest predictor of user acceptance of new technology, while perceived ease of use indirectly influences user acceptance by affecting perceived usefulness. Moreover, perceived ease of use also directly impacts users' attitudes and behavioural intentions.

F. D. Davis (1989) pointed out that there is a significant correlation between an individual's behavioural intention to accept and use a specific technology and their actual behaviour. Behavioural intention determines usage behaviour, while other variables influence it. In the TAM, perceived usefulness and perceived ease of use determine an individual's attitude, which, along with perceived usefulness, determines the individual's behavioural intention. At the same time, perceived ease of use positively affects perceived usefulness.

TAM is a critical theory in information systems that predicts user acceptance and usage behaviour of new technologies. The model, proposed by F. D. Davis (1989), is based on several core components and concepts, which explain the relevant variables in the TAM as follows:

1. Perceived usefulness refers to the user's belief that adopting a particular technology will enhance their job performance. F. D. Davis (1989) emphasized that if users believe the new technology can help them complete work tasks more effectively, this belief will positively influence their willingness to adopt the technology.

2. Perceived ease of use refers to how easily a user believes they can use a particular technology based on their subjective judgment. F. D. Davis (1989) pointed out that if users perceive a new technology as easy to learn and effortless to use, they are more likely to accept and utilize it.

3. External variables: These factors influence perceived usefulness and perceived ease of

use, such as system design features, individual user characteristics, task complexity, and support and training. F. D. Davis (1989) believed these external factors indirectly affect user acceptance and usage behaviour by influencing users' perceived usefulness and perceived ease of use.

4. Attitude: The user's emotional reaction to adopting a new technology is their positive or negative opinion about using the technology. F. D. Davis (1989) suggested that users' attitudes are influenced by perceived usefulness and perceived ease of use, affecting their behavioural intentions.

5. Behavioural intention refers to the intrinsic motivation and degree of planning a user has toward adopting new technology. F. D. Davis (1989) believed that the user's overall assessment of the new technology's perceived usefulness and ease of use determines behavioural intention, which is the most direct precursor to predicting actual user behaviour.

6. Actual system use refers to the observable behaviour of users' utilization of information technology. F. D. Davis (1989) emphasized that the ultimate goal is to understand and predict this behaviour, and behavioural intention is a critical mediating variable in achieving this goal.

With the widespread application of the TAM, many researchers have validated its effectiveness in different technologies and environments. For instance, the study by Rafique et al. (2020) indicates that perceived usefulness and perceived ease of use are key factors influencing the intention to use mobile library applications. The research by Talantis et al. (2020) found that perceived usefulness is the strongest predictor of user attitudes towards mobile conference applications and that attitude is an essential factor affecting overall conference satisfaction. Moreover, the impact of perceived ease of use varies significantly among users of different age groups.

Venkatesh and Davis (2000) further developed the TAM, proposing TAM2 to address some limitations of the original model. TAM2 introduced factors such as social influence processes (subjective norms, image) and cognitive instrumental processes (job relevance, output quality, result demonstrability) to explain technology acceptance behaviour comprehensively. Research has proven that these factors significantly affect perceived usefulness and users' behavioural intentions, enhancing the model's explanatory power and predictive accuracy.

Research on the TAM and its subsequent versions indicates that understanding the extent to which users accept new technology requires consideration of multiple factors, including the characteristics of the technology itself, the psychological state of the user, the social environment, and the support systems in place during implementation. These factors collectively influence users' perceptions and behaviours, ultimately determining the adoption and usage of new technology. As technology evolves and user needs change, TAM and its

derivative models remain essential tools for researchers and practitioners to understand the technology acceptance process.

2.4.4 Technology acceptance model 2

Venkatesh and Davis (2000) significantly extended the original TAM in 2000, creating the second-generation model known as TAM2. TAM2 retained the core constructs of the original TAM model, namely Perceived Usefulness and Perceived Ease of Use, while adding several new constructs to address some limitations of the original model and provide a more comprehensive explanation of technology acceptance behaviour.

In TAM2, constructs such as Subjective Norms, Image, Voluntariness, and Cognitive Instrumental Processes, which include Job Relevance, Output Quality, and Result Demonstrability, were incorporated into the model.

Venkatesh and Davis (2000) explained the variables within the TAM2 model to understand user acceptance of technology better. The following is a further expansion and refinement of these variables.

1. Subjective Norm refers to the user's perception of the expectations of important people around them (such as colleagues, superiors, family, and friends) regarding their use of a specific technology. This type of social pressure can significantly influence an individual's behavioural intentions, especially in cultures or organizations with powerful social influence.

2. Image pertains to how users believe using a particular technology will affect their image or status within their social group. This perception may motivate users to adopt new technologies to maintain competitiveness or a sense of modernity among colleagues or within their industry.

3. Voluntariness refers to the user's perception of autonomy in using technology. If users feel that using technology is their choice rather than something forced upon them, they will likely be more optimistic about accepting and using it.

4. Job relevance is the user's perceived relevance of the information technology to their job responsibilities. If users believe that a particular technology is closely related to their work, they may consider it more helpful.

5. Output quality is the user's perception of the effectiveness of using information technology to complete tasks. High-quality outputs can increase user satisfaction with the technology, thereby increasing acceptance.

6. Result demonstrability is the user's perception of whether the results of using a particular technology are noticeable, observable, and measurable. When users see the positive outcomes

of using technology, they are more likely to accept it.

In recent years, scholars have utilized the TAM2 model to conduct numerous studies to explore the drivers of technology acceptance in different fields. For instance, the study by G. Wang et al. (2022) investigated the factors influencing consumers' acceptance of Behavioural Targeting Advertising (BTA) services. The research found that social influence significantly altered people's perceptions of BTA. At the same time, consumers' voluntariness had little impact on the acceptance of BTA, suggesting a certain level of coercion between providers and consumers of BTA services. Therefore, enhancing consumer engagement might promote a more positive attitude towards BTA services. The study by Doo and Bonk (2021) examined the impact of students' cognitive tool processes on their perceived usefulness and intention to use flipped learning. The results indicated that the quality of learning outcomes significantly affected students' perceived usefulness and intentions to use flipped learning. White et al. (2018) employed the TAM2 model in a study conducted in Kampala, Uganda, to explore the feasibility, acceptability, and adoption of digital fingerprint technology in household tuberculosis contact investigations. The findings suggested that TAM2 provided a valuable framework for understanding the motivations of community health workers to use the technology.

Although TAM2 has made significant progress in explaining and predicting technology acceptance, it has also faced criticism. In particular, TAM2 has been criticized for overemphasizing instrumental cognitions, such as perceived usefulness and perceived ease of use, needing to adequately consider users' intrinsic motivations, such as enjoyment, interest, and satisfaction. These intrinsic motivations may be equally important, especially when users' use of technology is not solely for completing work tasks but also for personal fulfilment or entertainment. Consequently, subsequent research and model development, such as TAM3 and the UTAUT, have attempted to incorporate more variables to explain and predict technology acceptance and usage behaviour.

2.4.5 Unified theory of acceptance and use of technology

This section will provide an overview of UTAUT and the related research literature.

2.4.5.1 Theoretical overview

The discussion above covered TRA, TPB, and TAM, each with its strengths and specific issues. The theoretical constructs involved in the theories above are similar.

In order to develop a model with greater practicality and explanatory power, Venkatesh et al. (2003) integrated eight acceptance and adoption models to create UTAUT. The eight adopted

models are TRA, TAM/TAM2, the Motivational Model (MM), TPB, the combined TAM-TPB, the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT).

Venkatesh's UTAUT represents a significant synthesis of previous models, attempting to provide a more comprehensive understanding framework by integrating key constructs from multiple theories. The introduction of the UTAUT model marks a significant innovation in existing technology acceptance theories, as it not only incorporates the strengths of the models above but also strives to overcome their limitations. Empirical studies of the UTAUT model have shown that it possesses a high explanatory power in explaining users' technology usage behaviour, indicating that integrating multiple theoretical perspectives is beneficial. In empirical research, UTAUT's ability to explain usage behaviour exceeds 70%.

The UTAUT model remains centered around TAM, integrating the influence of external variables to form a comprehensive model. UTAUT consolidates variables from the eight models above into four core constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Additionally, the UTAUT model considers moderating variables such as gender, age, experience, and voluntariness of use, which can affect the relationship between the core constructs and the intention to accept and use technology. For instance, younger users may adopt new technologies faster than older users, and those with more experience using technology might more readily perceive the benefits of new technology. Venkatesh et al. (2003) provide explanations for these variables as follows:

1. Performance Expectancy: This is the belief and expectation of users regarding whether adopting new technology will improve their job performance. It is a synthesis of multiple theoretical concepts, including perceived usefulness from TAM, which refers to the user's belief that the technology will help them perform their job better; extrinsic motivation from MM, meaning the user perceives that using the technology will bring additional rewards or achievements; job-fit from MPCU, focusing on how well the technology fits with the user's job requirements; relative advantage from IDT, which is the user's belief in the superiority of the technology over existing methods; and outcome expectations from SCT, which are the user's expectations of the results that may arise from using the technology.

2. Effort Expectancy: An individual's perception of the effort and difficulty required to adopt new technology. It reflects the user's assessment of the energy needed to learn and use new technology. Perceived ease of use from TAM emphasizes whether users find the technology stress-free; complexity from MPCU focuses on the ease or difficulty of the technology; and image from IDT refers to how users believe adopting the technology will affect their social

status or professional image.

3. Social Influence: The attitude or perception of influential people around the user regarding whether or not to use information technology. It includes subjective norm from TRA, which is the social pressure perceived by the user; social factors from MPCU, involving the influence of colleagues and organizational culture on technology use; and image from IDT, reflecting how users think adopting new technology will affect their image within social groups.

4. Facilitating Conditions: The degree to which an individual feels supported using information technology. It involves the user's belief in the resources and help obtained when using the technology. Perceived behavioural control from TPB emphasizes the user's perception of the resources and opportunities needed to act; facilitating conditions from MPCU consider organizational support and technological infrastructure; and compatibility from IDT focuses on how well the technology matches existing values, experiences, and needs.

The empirical findings of Venkatesh et al. (2003) suggest that performance expectancy is often the main factor influencing behavioural intentions, particularly having a more significant impact on men and younger individuals. These two groups are more inclined to pursue efficiency and job performance. In contrast, effort expectancy has a more pronounced effect on women and older adults, possibly because these user groups place more excellent value on the ease of use of technology and the difficulty of learning to use it. Social influence plays a more significant role among female users, which may reflect a tendency for women to consider the opinions of others and social norms more in their decision-making process. Younger individuals are less affected by the attitudes of those around them, possibly because they are more confident or more willing to try and explore new things.

By integrating eight previous acceptance models, the UTAUT encompasses a broader range of factors and demonstrates more substantial explanatory power in accounting for individual technology acceptance and usage behaviour. This integrative model provides researchers and practitioners a powerful tool to predict and understand technology acceptance and use in various contexts.

2.4.5.2 Overview of UTAUT literature research

This study conducted a literature search using the Web of Science Core Collection database, with "UTAUT" as the subject keyword and restricted the language to English, which yielded 1555 related documents. These documents were imported into the Citespace software for data processing to facilitate a more in-depth analysis. Within Citespace, we set the node type to keywords and selected studies from the past ten years for analysis from January 2013 to

December 2023. This filtering resulted in 1468 valid documents. We set "Year Per Slice" to 2 years to refine the temporal trends, allowing us to observe the research dynamics within each period. At the same time, we set "Top N" to 25, indicating that we extracted the top 25 most frequent core keywords for each time slice.

We obtained a keyword co-occurrence network of 549 nodes and 3038 links through this process. This co-occurrence network reveals the key research themes of the UTAUT model and reflects the relationships and interactions between these themes. By analyzing the timeline map of keyword clusters, we can observe the formation and development trends of various research fields.

The cluster analysis results showed that the cluster sequence numbers, average years, and the number of members provide us with necessary information about the maturity and scale of the research fields. By employing the "Long Likelihood Ratio" method to extract keywords, we generated a keyword data chart, which helps us to identify and interpret the structure of the research fields more clearly. The Modularity Q value of the cluster structure is 0.4192, which exceeds the threshold of 0.3, indicating that the clustering structure is significant. At the same time, the Weighted Mean Silhouette value is 0.7201, surpassing the threshold of 0.7, meaning that we can trust the reliability of the clustering structure.

Through the cluster timeline graph analysis, we found that research on the UTAUT model in the electronic health domain began in 2014, and as time progressed, the volume of research in this field gradually increased. The specific contents of the cluster graph and the cluster timeline graph are displayed in Table 2.3 and Figure 2.4, respectively.

Table 2.3 Overview of keyword clustering in the UTAUT research field from 2013 to 2023

Cluster-ID	Size	Silhouette	Mean (Year)	Cluster
#0	82	0.658	2018	effort expectancy
#1	76	0.852	2014	mobile banking
#2	67	0.693	2018	information quality
#3	59	0.712	2018	mobile learning
#4	59	0.637	2017	user satisfaction
#5	49	0.737	2017	protection motivation theory
#6	47	0.723	2019	electronic mental health
#7	47	0.723	2020	autonomous vehicles
#8	37	0.68	2019	structural equation modelling
#9	20	0.848	2017	UTAUT model

CiteSpace, v. 5.1.R6 (64-bit) Basic
 February 16, 2023 at 9:52:10 AM CST
 WoS: D:\WOS_UTAUT\data
 Timespan: 2013-2023 (Slice Length=2)
 Selection Criteria: g-index (k=25), LRF=3.0, L/N=10, LBY=5, e=1.0
 Network: N=549, E=3038 (Density=0.0202)
 Largest CC: 543 (98%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.4192
 Weighted Mean Silhouette S=0.7201
 Harmonic Mean(Q, S)=0.5299

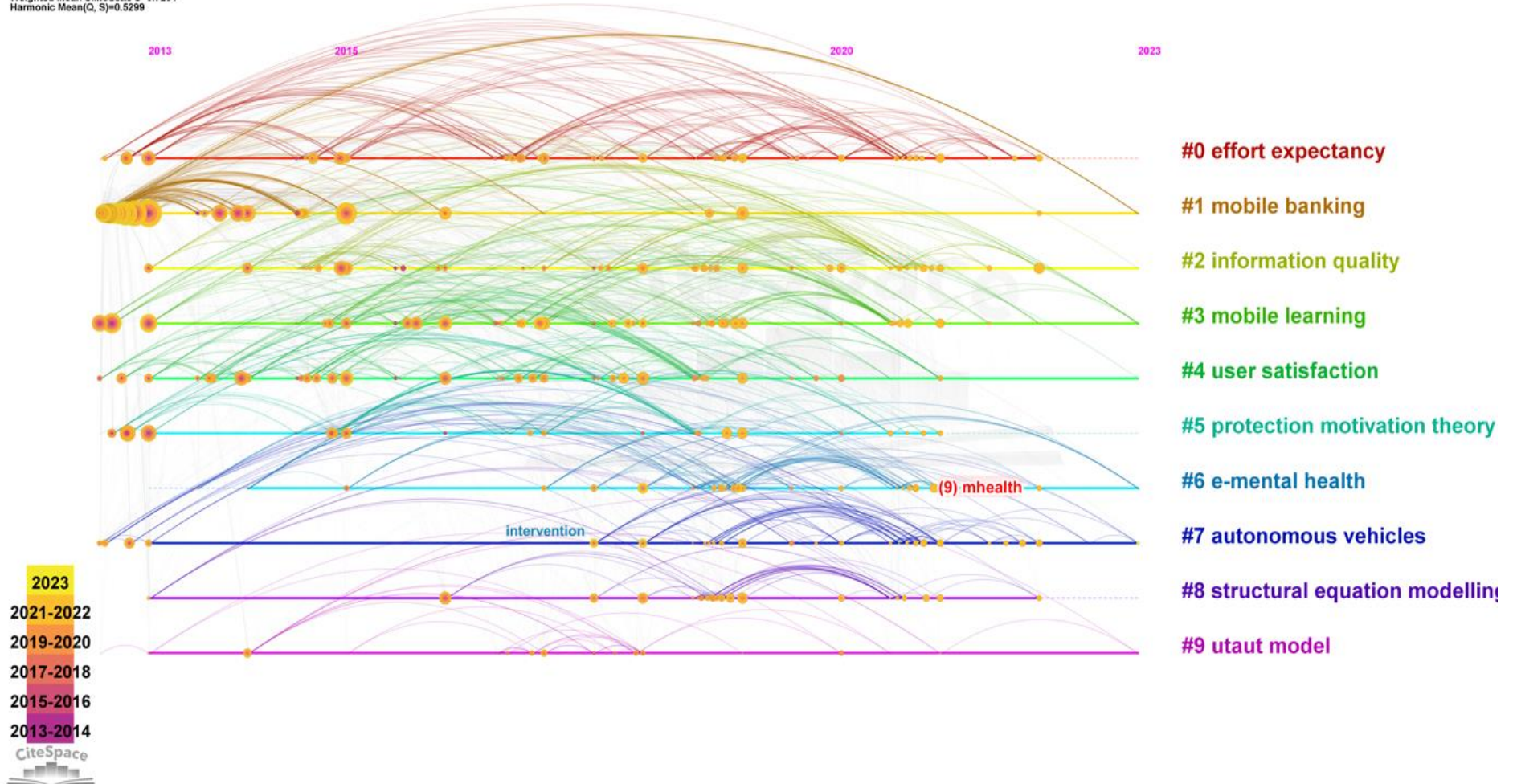


Figure 2.4 Timeline graph of keyword clustering in the UTAUT research field from 2013 to 2023

In all the research themes, the top nine topics identified through cluster analysis include effort expectancy, mobile banking, information quality, mobile learning, user satisfaction, protection motivation theory, electronic mental health, autonomous vehicles, and structural equation modelling. Each cluster group has more than 20 members, indicating that these clusters are significant in scale and rich in membership. It reflects the widespread application and in-depth research of the UTAUT model in these areas.

Furthermore, these analytical results can guide future research directions. For instance, researchers could explore the application of the UTAUT model in the electronic health domain or further refine the model in areas such as mobile banking and mobile learning. In this way, researchers have developed the UTAUT model theoretically, validated it, and applied it in practice. Through cluster analysis, we can gain a deeper understanding of the application of the UTAUT model across different domains.

Cluster #1 reveals the extensive application of UTAUT in the mobile banking sector. As a significant branch of financial technology, studying user acceptance in mobile banking is crucial for the innovation and service improvement of banking operations. By analyzing users' performance expectancy, effort expectancy, social influence, and facilitating conditions, banks can better comprehend customers' needs and expectations for mobile banking services, thereby designing products and services that more closely align with user requirements.

Cluster #4 demonstrates the application of UTAUT in electronic health research. Studies on accepting electronic health technologies contribute to advancing telemedicine services, especially during global health crises such as the COVID-19 pandemic. For instance, the research by Shiferaw et al. (2021) indicates that effort expectancy and attitude significantly affect the acceptance of telemedicine among Ethiopian health professionals. This study, from the perspective of healthcare technicians, suggests that performance expectancy plays a crucial role in promoting the development of telemedicine. Additionally, some scholars have applied UTAUT from the perspective of patients' usage. For example, the study by H. Wang et al. (2021) further confirmed that performance expectancy, effort expectancy, and facilitating conditions have a positive impact on patients' use of mobile health services. These factors should be paramount in developing mobile health services to enhance patients' acceptance and intention to use them.

Moreover, performance expectancy, effort expectancy, facilitating conditions, technophobia, resistance to change, and perceived usefulness affect the use of mobile health by older adults (Y. Ma & Luo, 2022; Moudud-Ul-Huq et al., 2021). Furthermore, Cao et al. (2022) explored the behavioural intentions of Japanese youth in adopting mobile health. The study

found that trust, performance expectancy, and effort expectancy are key factors directly influencing behavioural intentions. In contrast, health consciousness and social influence indirectly affect behavioural intentions through trust and performance expectancy, providing strategic directions for promoting mobile health applications.

Cluster #4 also reveals the application of UTAUT in the context of remote psychological research. For example, Sora et al. (2021) utilized an extended UTAUT model to examine people's acceptance and use of telepsychology. This study provides insights into how to promote the use of telepsychology services by understanding users' perceptions of them. In addition, K. M. Mitchell et al. (2022) research focuses on college students' intentions to use mental health apps. The findings emphasize the importance of considering performance expectancy and social influence when developing mental health applications.

Overall, these studies indicate that the UTAUT model is a robust tool that can assist researchers and practitioners in understanding and predicting emerging technologies' user acceptance and usage behaviour. Researchers have thoroughly demonstrated the applicability and flexibility of the UTAUT model by applying it across different domains and user groups. These research findings support the theory and offer valuable insights for implementing technology promotion and user training.

2.4.5.3 Summary

The pioneering work of Venkatesh et al. (2003) provided a comprehensive theoretical framework for understanding technology acceptance and usage. Their proposed UTAUT integrates key components from eight previous models, including TRA, TAM/TMA2, TPB, the Combined TAM and TPB, IDT, SCT, MPCU, and MM. The UTAUT model explains users' acceptance and intention to use technology through four core constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions.

In empirical testing, Venkatesh et al. (2003) conducted rigorous validation of the UTAUT model, including cross-validation, to ensure its robustness and universality. They found that the UTAUT model could explain 70% of the variance in usage intention (adjusted R^2), significantly higher than previous models. It marks a significant advancement in understanding technology acceptance. This high proportion of variance explained indicates that the UTAUT model can effectively predict and explain user behaviour regarding technology acceptance and use.

Subsequent research further confirmed the broad applicability of the UTAUT model. In electronic banking, the UTAUT model was used to study consumers' acceptance of online banking services, revealing users' expectations of this emerging service's anticipated benefits

and convenience. In electronic health, the UTAUT model helped researchers understand the acceptance levels of medical professionals and patients towards electronic health records, telemedicine, and mobile health applications, as well as how these technologies can improve the quality and efficiency of healthcare services.

Therefore, given the successful application of the UTAUT model in various fields and its strong predictive power in explaining technology acceptance, this study will adopt the UTAUT model as its theoretical foundation. This research aims to explore the level of acceptance of IH by doctors as the target user group and which factors influence their acceptance and intention to use IH. By employing the UTAUT model, we can better understand doctors' attitudes towards this new IH technology and how social and environmental factors influence their behaviour in accepting technology. Hence, based on the UTAUT model, we propose the following hypotheses:

H1: Performance expectancy positively affects doctors' intentions to use IH.

H2: Effort expectancy positively affects doctors' intentions to use IH.

H3: Social influence positively affects doctors' intentions to use IH.

H4: Facilitating conditions positively affects doctors' actual use behaviour of IH.

H5: Doctors' intentions to use IH positively affect their actual use behaviour.

2.5 Empathy

Empathy, as a complex psychological phenomenon, has a history that dates back to the latter half of the 19th century when the German term "Einfühlung," meaning a profound emotional resonance, was first introduced by individuals such as Hermann Lotze, Robert Vischer, and Theodor Lipps. This concept was translated into English as "Empathy" by Edward Titchener in 1911, becoming a focal point of study in multiple disciplines such as philosophy, sociology, and psychology (Patoine, 2022). Once introduced, empathy sparked widespread interest in the academic community, with researchers meticulously exploring it from various perspectives.

In the broadest sense, empathy, according to M. H. Davis (1983), is an individual's reaction to another person's experiences. Hogan (1969) viewed empathy from a cognitive perspective, considering it the ability to understand the viewpoints of others, that is, the capacity to put oneself in another's shoes. Hoffman (1977), on the other hand, emphasized that empathy includes understanding another person's inner state from their perspective and consequently having an emotional response. E. Stotland (1969) defined empathy from an affective viewpoint as the ability to experience the emotions and feelings of others. These varying definitions reflect

scholars' attention to the two dimensions of empathy: Cognitive empathy and Affective empathy.

In their review of historical literature, Cuff et al. (2016) identified 43 different definitions of empathy and noted that while definitions should be diverse, one should avoid confusion. They proposed that empathy is an emotional response that depends on the interplay between trait capacities and state influences and is affected by top-down control processes. This definition embodies the dual factors of cognition and effect and indicates that empathy can lead to behavioural outcomes.

Despite the numerous controversies surrounding empathy in social and moral spheres, these debates often neglect social environments and organizations' role in fostering or inhibiting empathy (Read, 2023). Focusing on the influence of social environments and organizations on empathy, scholars have explored ways to enhance their role in cultivating empathy.

For instance, Haque's (2019) research indicates that medical educators and physician teams increasingly recognize the importance of empathy in medical practice. In the medical field, incorporating narrative medicine into medical education and clinical practice has been shown to effectively develop physicians' empathy (Cheshire et al., 2021). In addition to narrative medicine, immersive courses have also been proven to effectively boost clinicians' empathy and communication skills, suggesting that training and education can significantly improve empathy and sustain this improvement over time (Mehta et al., 2021).

Unlike traditional medical models, telemedicine does not allow face-to-face communication between doctors and patients. Therefore, the communication model and therapeutic relationship of telemedicine rely heavily on empathy. Nonverbal means such as facial expressions, tone of voice, and attentiveness can convey empathy (Cheshire et al., 2021; Henry et al., 2017). During the COVID-19 pandemic, patients placed greater emphasis on physicians' empathy in medical interactions, desiring more understanding and care from their doctors (Y. J. Wang et al., 2022). At the same time, Mert et al. (2021) found that patients' perceived levels of empathy were closely linked to the level of empathy demonstrated by physicians, leading to recommendations for strengthening the cultivation of empathy in medical students within medical education.

Empathy is an emotional experience and an altruistic sentiment that reflects an individual's care and concern for other members of society. The research by Fisher et al. (2023) suggests that social empathy is a crucial predictor of racial attitudes, and empathic interventions within social service environments may improve intergroup relations. Individuals with empathy are more likely to engage in altruistic behaviours both within and outside of organizations (Craig-

Lees et al., 2008; Kamdar et al., 2006), and those who are empathetic and emotionally stable are more willing to commit to volunteer services (Penner, 2002; Stolinski et al., 2004). Additionally, the study by K. F. Chang et al. (2022) indicates that human decision-making is often based on emotions and sometimes on reason. Their research aims to demonstrate that even when confronted with emotional events, volunteers, as rationalists, can maintain rationality. They found that empathy positively impacts social and behavioural intentions, which is consistent with the findings of other researchers.

Related studies have also shown a correlation between empathy and behavioural intentions. For example, Yan and Cortese (2023) investigated the relationship between the reduction, reuse, and recycling of plastic bags for marine environmental protection from the perspective of eliciting public empathy and guilt. The results indicated that empathy could increase the public's sense of guilt, thereby encouraging behaviours to reduce, reuse, and recycle plastic bags. It demonstrates a specific connection between empathy and behavioural intentions. In the tourism sector, Orden-Mejía et al. (2023) explored the impact of chatbots on the tourism industry. The study found that empathy is a crucial factor driving tourists' intentions to visit destinations. This research also shows that empathy can directly influence behavioural intentions. Additionally, de Kervenoael et al. (2020) focused on the rise of social robots in hotel services to understand guests' behavioural intentions to use social robots in hotels that provide such services. Through a mixed-methods approach, their research concluded that empathy significantly positively affects the intention to use social robots in a hotel service environment.

Therefore, empathy enables doctors to understand patients' suffering better and the need for online diagnosis and treatment, thereby promoting the acceptance of IH by doctors. However, it can also positively affect a broader range of social and behavioural intentions. Assuming that there is a correlation between empathy and the intentions of doctors to use IH, we can enhance doctors' empathy through training and education to encourage doctors to use IH, thereby advancing the development of IH. Based on the literature above, we propose Hypothesis 6.

H6: Empathy positively affects doctors' intentions to use IH.

2.6 Chapter summary

This chapter systematically reviews and revisits the theories related to Chinese IH, stakeholder theory, and technology acceptance, focusing on the comprehensive review of the UTAUT and its related applications. The literature review reveals the theoretical and research status quo of doctors' acceptance of IH, providing a solid theoretical foundation and a multi-angle perspective

for this study.

Firstly, as a product of the national digital transformation and the "Internet Plus" strategy, IH is leading a transformation in the medical service model. Their convenience and service accessibility have been widely recognized, especially in improving the efficiency of medical services in remote areas. However, the lack of face-to-face communication and concerns about medical data security are significant challenges in developing IH. Despite these challenges, advancements in information technology and support from national policies are continuously driving the development of IH.

Secondly, theories and models related to technology acceptance, especially the UTAUT, provide a stable and reliable analytical framework for understanding the key factors influencing an individual's degree of technology acceptance. Researchers have widely applied the comprehensive theoretical framework of the UTAUT model to digital transformation research in various industries, including electronic banking and online education.

Thirdly, medical service is a profession for doctors and a manifestation of respect for and care about life. In China, society expects doctors to possess noble moral qualities, which may require them to sacrifice personal time when providing Internet medical services. Literature indicates that medical personnel with empathy are more inclined to provide voluntary services, and effective communication with patients can lead to better treatment outcomes. Previous research has also revealed that empathy positively impacts behavioural intentions. Therefore, this study aims to explain the relationship between empathy and doctors' intentions to use IH.

Finally, research combining IH with the UTAUT from the doctors' perspective is relatively scarce, primarily since this study also extends the UTAUT by including empathy as a variable. The innovation of this study lies in filling this gap, aiming to deepen the understanding of doctors' acceptance attitudes towards IH to provide a comprehensive understanding and support for the development of IH. This research will reveal doctors' attitudes towards IH and provide strategic recommendations for medical institutions implementing Internet medical services.

Chapter 3: Research Method

This chapter aims to construct a research framework based on a literature review, utilizing the UTAUT and the construct of Empathy to elucidate the influence of UTAUT and Empathy on doctors' intention to accept IH in Guangdong Province. This study pays particular attention to the subjective perceptions of doctors in Guangdong Province regarding IH and seeks to uncover the key factors influencing their intention to accept. To ensure the systematic and scientific integrity of the research, we will first propose a detailed research model based on an in-depth reading and analysis of existing literature. Subsequently, this study will formulate research hypotheses based on the anticipated relationships between the variables within the research model. These hypotheses will provide a clear direction for subsequent data collection and analysis and aid in validating the model's effectiveness.

In terms of method, this study will employ a questionnaire survey, which is a common and effective method for investigating subjective intentions in social science research (Mark et al., 2016). This chapter will elaborate on the questionnaire design process to ensure its reliability and validity. We will meticulously plan the structure and content of the questionnaire to ensure it covers all key research variables and indicators. Finally, this chapter will also discuss the specific process of data collection. We will describe the distribution methods of the questionnaire, including the choice between online surveys and paper-based surveys, as well as the selection criteria for survey participants. Through this chapter's detailed planning and design, we expect to collect high-quality data to lay a solid foundation for subsequent data analysis and research conclusions.

3.1 Research model and hypotheses

As an emerging healthcare service model, IH is progressively transforming the landscape of traditional medical services. Despite their significant potential for development, the intrinsic operational mechanisms and influencing factors of IH require further investigation. This study aims to construct a theoretical model to analyze and explain the extent to which doctors accept the technology of IH. Drawing upon the UTAUT model, this research will examine critical variables such as Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Behavioural Intention (BI), and Usage Behaviour (UB). Moreover,

given the unique nature of medical services, this study will incorporate Empathy as a significant variable to explore its role in accepting technology.

3.1.1 Research model

The UTAUT model is a significant tool for understanding and predicting user acceptance and use of information technology. This study adopts the UTAUT model proposed by Venkatesh et al. (2003), which explains users' behavioural intentions and usage behaviour through four core constructs: PE, EE, SI, and FC, with a prediction accuracy of up to 70%. This study incorporates Empathy into the model to explore its potential impact on doctors' acceptance of IH. IH enable doctors to use their time more flexibly to serve patients, and Empathy, as one of the core values of medical service, may enhance doctors' acceptance of this new service model.

Therefore, this study proposes a UTAUT model that includes Empathy to analyze the acceptance of IH among the doctors in Guangdong Province. The construction of the model is illustrated in Figure 3.1.

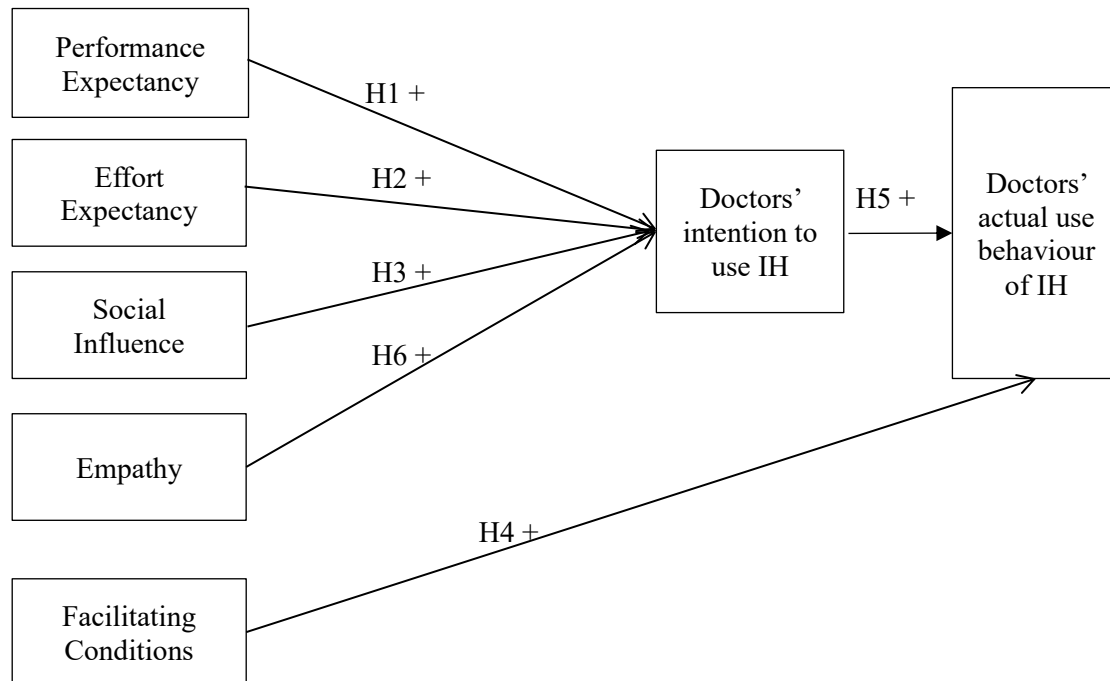


Figure 3.1 Research model

3.1.2 Research hypotheses

Based on a comprehensive analysis of the relevant literature, this study proposes the following six research hypotheses aimed at examining the relationships between the variables in the IH technology acceptance model:

H1: Performance expectancy positively affects doctors' intentions to use IH.

H2: Effort expectancy positively affects doctors' intentions to use IH.

H3: Social influence positively affects doctors' intentions to use IH.

H4: Facilitating conditions positively affect doctors' actual use behaviour of IH.

H5: Doctors' intentions to use IH positively affect their actual use behaviour.

H6: Empathy positively affects doctors' intentions to use IH.

Empirical research will validate these hypotheses to ensure the effectiveness and reliability of the model. This study will analyze survey data from the doctor community in Guangdong Province to investigate how these variables affect doctors' acceptance of IH.

3.2 Research questionnaire design

This study aims to delve into the subjective acceptance of IH by the doctors in Guangdong Province through quantitative research methods. For this purpose, we have adopted the questionnaire survey as our primary data collection tool. The advantage of the questionnaire survey lies in its ability to efficiently collect data from a larger sample while maintaining the standardization and systematic nature of the research. However, the quality of the questionnaire design and the standardization of data collection is crucial to the reliability and validity of the research findings. Therefore, we took several measures while compiling and implementing the questionnaire to ensure we met these requirements (Mark et al., 2016).

During the questionnaire design phase, we first clarified the research objectives and hypotheses, all based on an extensive literature review. We ensured that each question in the questionnaire was closely related to the research objectives and could effectively test our hypotheses. We carefully chose the language for the questionnaire to ensure it was both professional and easy to understand, avoiding industry jargon or complex expressions to minimize potential misunderstandings and confusion. Additionally, we paid particular attention to the logical structure and flow of the questionnaire so that participants could complete it smoothly, thereby reducing the likelihood of them dropping out midway.

To ensure that participants could answer questions autonomously and sincerely without external interference, we designed a detailed informed consent form at the beginning of the questionnaire. This consent form thoroughly explained the purpose of the research, the process, the rights of the participants, and any potential risks they might face. We emphasized that the participants' information would be kept strictly confidential and that they had the right to withdraw from the study at any time. Additionally, we explained the importance of the

participants' feedback to the research to improve the questionnaire's response rate and the data's quality. We thanked them for their valuable time and contribution.

Ultimately, we developed a detailed data collection plan, which included the questionnaire's distribution, retrieval, and data entry process. We adopted an online survey method to ensure we could reach many doctors. During the data collection, we closely monitored the data's response rate and quality, promptly addressing any issues.

3.2.1 Questionnaire design rationale

Before designing the questionnaire, we reviewed the relevant literature comprehensively to ensure that the content accurately reflects the research objectives and requirements. On this basis, we constructed a research model framework to guide the questionnaire's specific content and structural design. We carefully chose the language for the questionnaire to ensure it was professional and easy to understand, avoiding industry jargon or complex expressions to minimize potential misunderstandings and confusion.

During the process of questionnaire design, we followed three fundamental principles:

The first is the principle of applicability: The scales we selected must apply to the study's specific context in Guangdong Province, China. This principle of applicability means that each item on the scale must align with the actual circumstances of the doctors in Guangdong Province and must be able to measure their acceptance of IH effectively.

The second is the principle of completeness: We did not omit any items from the existing scales to maintain their original structure. This approach helps preserve the scales' internal consistency, ensuring we can assess their reliability and validity accurately.

Lastly, we adhered to the principle of cultural adaptability: Since we conducted this study in China, we gave particular attention to ensuring the scale items were culturally adaptable. We referred to related research conducted in China by Abbad (2021) to ensure the questionnaire's applicability and accuracy within the Chinese cultural context.

Guided by the abovementioned principles, we conducted an in-depth analysis of seven variables: PE, EE, SI, FC, BI, UB, and Empathy. We reviewed literature related to these variables and selected scales with high reliability and validity as references (Abbad, 2021; Al-Saedi et al., 2020; Dietz & Kleinlogel, 2014; Erjavec & Manfreda, 2022; Tian & Robertson, 2019; Venkatesh et al., 2003). In choosing the scales, we specifically focused on those widely used and repeatedly validated to ensure our selection was scientifically sound and robust.

With this rigorous approach to questionnaire design, our developed questionnaire will effectively measure the acceptance of IH among the doctors in Guangdong Province and

provide a solid foundation for subsequent data analysis and research conclusions.

3.2.2 Questionnaire design process

This study identified the key variables that needed to be measured based on an extensive literature review and a deep understanding of the research model. We selected these variables to comprehensively capture the multidimensional characteristics of the doctors' acceptance of IH in Guangdong Province. Building on this, we adopted the UTAUT model and incorporated Empathy as an essential supplementary variable to better understand the doctors' behaviours and attitudes.

Guided by the principles mentioned in the questionnaire design approach, we first thoroughly reviewed the application of the UTAUT model and Empathy in related research. We carefully examined the construction of the measurement items used in these studies to measure each variable effectively. In our study, we measured each variable with multiple items to enhance the questionnaire's reliability and the measurements' precision.

Next, we translated the UTAUT questionnaire into Chinese, changing only the research subject to IH while keeping all other expressions unchanged. We sent the translated questionnaire to two doctors and two hospital administrators, asking them to evaluate the clarity of the questionnaire items to ensure that each item was precise, accurate, and easy to understand. They considered the questionnaire items to be articulated and easy to understand. Therefore, we did not make any modifications to the questionnaire. This step was crucial for avoiding potential misunderstandings and ensuring that respondents could accurately grasp the meaning of the items. For the Empathy questionnaire, we adopted the Chinese survey questionnaire by Tian and Robertson (2019) without any alterations to this well-established instrument.

Following the steps above, we finalized the measurement questionnaire for this study. This questionnaire reflects the research model's theoretical framework and considers practical application needs, laying a solid foundation for collecting high-quality data. Through this questionnaire, we gained profound insights into doctors' acceptance of IH and provided valuable references for future research and practice.

3.2.3 Questionnaire structure

In this study, the questionnaire design incorporated several critical components to ensure the comprehensiveness and accuracy of the data collected. Firstly, the beginning of the questionnaire is an informed consent form, which is designed to ensure that participants

understand their participation is voluntary and that they have been informed of all relevant information regarding the study. This was followed by a preface section, which provided participants with essential information on how to complete the questionnaire and conveyed our sincere gratitude for their valuable time and contribution. Subsequently, a section on basic demographic information was included, gathering vital data from participants, which is crucial for subsequent data analysis. Finally, the questionnaire featured an array of meticulously designed variable measurement scales aimed at accurately assessing and quantifying key variables within the research. Through this comprehensive questionnaire design, the study was able to collect high-quality data, providing a robust foundation for the testing of research hypotheses and the derivation of conclusions.

3.2.3.1 Informed consent form

We developed a detailed informed consent form to comply with the relevant research ethics requirements and ensure this study's legality and morality. This document ensures that each participant can decide whether to participate in the study based on a complete understanding of the research content and their related rights (Mark et al., 2016).

The content of the informed consent form covers the following key aspects:

1. Purpose and significance of the research: We clearly articulate to the respondents the primary purpose of this survey: to delve into doctors' acceptance of IH, analyzing influencing factors and mechanisms of action. Through this research, we hope to propose effective strategies and recommendations for the healthy and sustainable development of IH.

2. Risk assessment and privacy protection: We explain to the respondents that the risk associated with this survey is shallow. We will conduct the questionnaire anonymously, ensuring we do not disclose the participants' identities and the information they provide. We emphasize that the content of the survey will be limited to non-sensitive topics such as technology acceptance and Empathy and will not touch on issues that could cause discomfort or psychological burden. By the recommendations of the American Psychological Association (2020), researchers should retain their research data for a minimum of five years. Following this guideline, we will preserve the data from this study for five years.

3. Participant rights: We inform the participants that they have complete autonomy to decide whether or not to participate in this research. Participants can choose to withdraw at any time during the survey process without having to provide any reason. Additionally, participants have the right to decline any questions they prefer not to answer. We commit to strictly following relevant laws and regulations to protect the personal rights and privacy of the participants.

4. Access to research findings: We promise that, upon the research's completion, participants will have the right to obtain a summary of the findings. It will help participants understand how researchers have utilized their contributions for scientific discovery and practical improvements.

The design of the informed consent form aims to ensure that participants can make a wholly voluntary and informed decision. Before the survey begins, we will ensure that each participant has sufficient time to read the informed consent form and has the opportunity to ask any questions or express any concerns. Data collection will only proceed after a participant has explicitly indicated an understanding of the research content and agreed to participate. Through this transparent and respectful approach, we not only protect the rights of participants but also provide a solid foundation for the validity and credibility of the research.

3.2.3.2 Introduction

The introduction section plays a crucial role in this study's questionnaire survey. It provides participants with the basic information needed to complete the questionnaire and conveys our sincere gratitude for their valuable time and contributions. Although the informed consent form already provides detailed information about the research purpose, risk assessment, and participant rights, the introduction to the questionnaire still needs to guide participants succinctly through the questionnaire's completion.

In the introduction section of the questionnaire, we first provide participants with an overview of the content and the estimated time required to complete the questionnaire. We clearly state that completing the entire questionnaire will take approximately 5 minutes, allowing participants to assess whether they have sufficient time to complete it before beginning. Additionally, we express our deep gratitude to the participants in the introduction. We recognize their time is valuable, and we extend our heartfelt thanks for their willingness to contribute time to our study. We emphasize that the opinions of each participant are critical and that every response will significantly impact the research outcomes and may positively contribute to the future development of IH.

Through such an introduction design, we aim to provide participants with a clear and friendly guide to filling out the questionnaire. We also convey our respect and appreciation for their participation in the study. It not only helps to improve the response rate of the questionnaire but also ensures the data's quality and the research's overall success.

3.2.3.3 Basic information

In this study, collecting the basic information of respondents is essential for constructing a

comprehensive data framework. This framework aids in gaining a deeper understanding of the characteristics of the research sample and ensuring the broad applicability and accuracy of the research results. The collection of essential information includes, but is not limited to, gender, age, level of education, years of work experience, and professional titles held by the respondents.

By statistically analyzing this basic information, we can ensure the diversity and representativeness of our sample, thereby making the research findings more universally applicable and credible. Furthermore, analyzing this basic information can reveal potential patterns and trends, providing valuable clues and hypotheses for subsequent in-depth research. In the questionnaire design, we employ clear and concise questions to ensure that respondents can easily and quickly provide this information while guaranteeing the data collection's accuracy and validity.

3.2.3.4 Variable Measurement Scale

This section primarily discusses selecting measurement items to assess the variables within the research model. We adapted each item from currently established scales and incorporated findings from related research. The design of each item will be elaborated upon in detail in the subsequent parts of this chapter.

3.2.4 Methods of variable measurement

In psychological and social science research, accurately measuring variables is critical to understanding and interpreting behavioural and psychological phenomena. The diversity of variable measurement methods allows researchers to capture psychological data from different perspectives and levels. Researchers can obtain these data through various means, such as direct behaviour observation, physiological measurements, psychological tests, face-to-face interviews, or questionnaire surveys. Each method has its specific advantages and limitations, making the selection of appropriate measurement tools crucial for ensuring the validity of the research (Mark et al., 2016).

Self-report questionnaires are a widely used data collection tool, especially the Likert scale, favored by researchers for its simplicity and efficiency. The self-report Likert scale is commonly applied in psychological research (Clark & Watson, 2019). The Likert scale allows participants to rate a series of statements or questions based on their personal opinions or feelings, typically involving the degree of agreement with a particular construct or attitude.

Jebb et al. (2021) reviewed the development of the Likert scale over the past 25 years, noting that despite various forms of psychological measurement, the Likert scale is considered

the preferred method for measuring many psychological constructs due to its ability to provide consistent and comparable data. For example, Venkatesh et al. (2003) employed a 5-point Likert scale in the UTAUT model, and Dietz and Kleinlogel (2014) used it in their research on the Empathy scale.

In this study, we also used a 5-point Likert scale to measure the relevant variables. This scale includes five options: "Strongly Disagree", "Disagree", "Neutral", "Agree", and "Strongly Agree". This scoring method not only simplifies the response process but also allows participants to express their degree of feeling towards a specific statement, thereby providing a quantified, continuous dataset that facilitates subsequent statistical analysis. One of the main advantages of using the Likert scale is its ability to reduce potential biases, as it offers a standardized response framework that makes the answers from different participants comparable. Moreover, this scale's design also helps minimize the possibility of extreme and arbitrary responses, providing a neutral option for participants to choose. While designing the survey, we ensured that each Likert scale statement was clear, specific, and closely related to the research objectives to collect high-quality data.

3.2.5 Questionnaire bias control

Controlling for questionnaire bias is crucial to ensure questionnaire data quality and research outcomes' reliability. Questionnaire bias can stem from various factors, including but not limited to unclear phrasing of questions, participant misunderstanding, random answering, or social desirability effects. To minimize these biases to the greatest extent possible, we have adopted the following measures in the design and implementation of the questionnaire in this study:

Firstly, we meticulously crafted the questions in the questionnaire to ensure that each item is expressed in simple language, avoiding the use of jargon or complex sentence structures that could lead to misunderstandings. This approach helps respondents better understand the true meaning of each question, thereby providing accurate feedback.

Secondly, we provided participants with a detailed informed consent form before the start of the questionnaire survey. This consent form explained the purpose of the research, the participants' rights, the anonymity and confidentiality of the questionnaire, and the importance of completing it. By doing so, we ensured the ethical nature of the research and helped increase the respondents' trust and engagement, encouraging them to answer each question thoughtfully and honestly.

Thirdly, we incorporated several reverse-coded questions within the questionnaire to

identify and eliminate participants who may have filled out the survey haphazardly or not taken it seriously. The answers to these questions should contradict the answers to other questions. If a participant's responses show a lack of consistency, this may indicate that they still need to complete the questionnaire with due diligence. Such responses will be considered invalid and excluded from the final analysis.

Through these comprehensive measures, this study aims to enhance the quality of the questionnaire data, ensuring that the information collected accurately and truthfully reflects the views and attitudes of the respondents, thereby providing solid data support for the research.

3.3 Measuring variables

The accuracy of measuring variables is the cornerstone of ensuring the scientific nature of the research conclusions. Mark et al. (2016) emphasized the decisive impact of measurement quality on the scientific nature of research findings. To maintain the rigor and reliability of the research, we have implemented the following strategies to measure the critical variables in the study.

We selected scales for this study from research tools extensively validated in previous studies, demonstrating good reliability and validity. This approach ensures that our measurement instruments meet high scientific rigor and applicability standards. On this basis, we made necessary adjustments to the scales to fit the context of IH. Specifically, we retained the core item formulations of the original scales. We only made appropriate modifications to the descriptions of the study subjects to ensure that the questionnaire content aligns with the actual circumstances of IH.

Based on the literature review and the research model constructed for this study, seven variables must be measured: PE, EE, SI, FC, BI, UB, and Empathy. The following will explain each variable.

3.3.1 Performance expectancy (PE)

PE refers to an individual's belief and expectation that adopting new technology will enhance job performance. This concept, defined as perceived usefulness in the TAM, also manifests in other theoretical frameworks such as extrinsic motivation (MM), job fit (MPCU), relative advantage (IDT), and outcome expectations (SCT) (Venkatesh et al., 2003). A common thread among these theories is that they all emphasize the potential value of technology in improving job performance.

Al-Saedi et al. (2020) developed an extended model based on the UTAUT in mobile payments. Their findings indicated that PE significantly positively impacts the intention to use of mobile payment systems. Utilizing the Importance-Performance Map analysis method, researchers identified PE as the most critical predictor of the intention to use mobile payment systems. In educational technology, Abbad (2021) employed the UTAUT model to investigate the use of electronic learning systems among students in developing countries. His research identified PE as the strongest predictor of BI. In consumer behaviour, Erjavec and Manfreda (2022) studied online shopping during the COVID-19 pandemic and periods of social isolation, using an extended UTAUT model that incorporated group behaviour. Their empirical study found that PE was the most significant factor influencing respondents' use of online shopping.

In this study, PE represents the extent of the benefits doctors gain through the use of IH, that is, the improvement in convenience, efficiency, and work income for doctors. For instance, doctors can complete work tasks more quickly through IH, which enhances their work efficiency. PE also reflects the accessibility and convenience features of IH.

In summary, this study, referencing the research findings of Venkatesh et al. (2003), Al-Saedi et al. (2020), Abbad (2021), Zhao and Bacao (2021), and considering the unique characteristics of this research, has made appropriate adjustments to the language used in the questionnaire items. The measurement items for PE are set out as shown in Table 3.1.

Table 3.1 Measurement items for PE

Variable	Item No.	Item
PE	PE1	I find IH very useful in my work.
	PE2	Using IH enables me to complete work tasks more quickly.
	PE3	Using IH improves my work efficiency.
	PE4	Using IH increases my income.

Source: Venkatesh et al. (2003), Al-Saedi et al. (2020), Abbad (2021), Zhao and Bacao (2021)

3.3.2 Effort expectancy (EE)

EE refers to an individual's perception of the effort and difficulty required to adopt a new technology. Venkatesh et al. (2003) linked EE with perceived ease of use (TAM), complexity (MPCU), and ease of use (IDT) in their research, suggesting that these elements collectively constitute the factors influencing an individual's level of acceptance of new technology.

This study uses EE to measure doctors' perceived learning time and ease of operation when using IH. It relates to the convenience and user-friendliness of the IH's operations and directly affects the doctors' intentions to adopt the technology. Given that doctors often face a heavy workload, if the IH is complex and challenging to use, requiring a significant amount of time

to learn and master, then their intentions to use it may significantly decrease. Conversely, if the system is designed to be user-friendly, easy to learn, and operate, the doctors' intentions to use it may increase.

Abbad (2021) found in his research on the willingness of students in developing countries to use electronic learning systems that EE is the second most crucial factor affecting their willingness to use, indicating that the design of electronic learning systems should simplify the operational process and enhance user-friendliness as much as possible. Al-Saedi et al. (2020) also found in their meta-analysis study on the factors influencing the willingness to use mobile payment that EE is a significant favorable influence variable, meaning that the design of mobile payment systems should consider the convenience of user operation.

In summary, drawing from the research findings of the abovementioned scholars and considering the specific context of this study, which focuses on IH and targets healthcare professionals in China, appropriate adjustments have been made to the language and wording of the questionnaire items. The measurement items for EE are set as shown in Table 3.2.

Table 3.2 Measurement items for EE

Variable	Item No.	Item
EE	EE1	My interaction with the IH would be clear and understandable.
	EE2	It would be easy for me to become skillful at using the IH.
	EE3	I would find the IH easy to use.
	EE4	Learning to operate the IH is easy for me.

Source: Venkatesh et al. (2003), Al-Saedi et al. (2020), Abbad (2021), Zhao and Bacao (2021)

3.3.3 Social influence (SI)

SI refers to the impact of the attitudes or perceptions of influential individuals around a person when deciding whether to use information technology. In various theoretical models, SI is considered a key factor affecting the acceptance and use of technology. Venkatesh et al. (2003) derive its elements from Subjective Norms (TRA), Social Factors (MPCU), and Image (IDT).

Muangmee et al. (2021) found that SI significantly positively affected the BI's use of food delivery apps during the COVID-19 pandemic. Al-Saedi et al. (2020) also showed that SI significantly positively affected people's intention to use mobile payment systems. Similarly, Zhao and Bacao (2021), in their research on the factors influencing the acceptance of mobile payments, confirmed that SI could significantly positively affect users' intentions to use.

In this study targeting doctors, SI specifically refers to those individuals who can impact doctors' thoughts and behaviours. It includes people the doctors consider essential, such as family members, friends, colleagues, hospital management and technical teams. Support from hospital administration and colleagues for using IH and encouraging technology adoption from

the doctors' affiliated institutions may positively affect the doctors' intentions to adopt IH. The measurement items for SI are set as shown in Table 3.3.

Table 3.3 Measurement items for SI

Variable	Item No.	Item
SI	SI1	People who influence my behaviour think that I should use the IH.
	SI2	People who are important to me think that I should use the IH.
	SI3	The senior management of this business has been helpful in the use of the IH.
	SI4	In general, the organization has supported the use of the IH.

Source: Venkatesh et al. (2003), Al-Saedi et al. (2020), Abbad (2021), Zhao and Bacao (2021)

3.3.4 Facilitating conditions (FC)

FC refers to the degree of support an individual perceives when using information technology, which can be technical, organizational, or environmental. In theoretical models, FC is often associated with perceived behavioural control (TPB), facilitating conditions (MPCU), and compatibility (IDT). These elements collectively influence an individual's attitude and behaviour towards adopting technology (Venkatesh et al., 2003).

In this study, FC refers to the technical support, equipment, and usage conditions provided to doctors to enable them to use IH effectively. Therefore, this study refers to the research findings of Abbad (2021) and Venkatesh et al. (2003) in the UTAUT, which indicated that FC significantly impacts technology use behaviour.

In this study, FC refers to the technical support, equipment, and usage conditions provided to doctors to enable them to use IH effectively. Therefore, this study refers to the findings of Venkatesh et al. (2003) and Abbad (2021). Considering the actual circumstances of this research, the following items for measurement have been established, as shown in Table 3.4.

Table 3.4 Measurement items for FC

Variable	Item No.	Item
FC	FC1	I have the resources necessary to use the IH.
	FC2	I have the knowledge necessary to use the IH.
	FC3	The system is not compatible with other system I use (R).
	FC4	A specific person (or group) is available for assistance with IH difficulties.

(R) is used as a reverse item to assess the quality of questionnaire responses, and it should be scored in the opposite direction during scoring.

Source: Venkatesh et al. (2003), Abbad (2021)

3.3.5 Behaviour intention (BI)

BI is a core concept in psychological and sociological research, representing the degree to which an individual intends and plans to perform a specific action in the future. In information systems, BI is often used to predict users' acceptance and use of new technologies. According

to Ajzen's (1991) TPB, attitudes, subjective norms, and perceived behavioural control influence behavioural intention, which is the most direct predictor of an individual's behaviour.

Venkatesh et al. (2003), in their proposed UTAUT, define BI as the user's intention, anticipation, and planning for future use of technology. This model posits that PE, EE, SI, and FC directly influence BI.

Rahi and Abd. Ghani (2019) studied technology acceptance among online banking users in Pakistan. They employed the BI measurement items from the UTAUT model. Their research further confirmed the pivotal role of BI in predicting user acceptance and use of technology.

The BI in this study refers to the intentions of the doctors to use IH in Guangdong Province, which will be measured using the measurement items from Venkatesh et al. (2003), as shown in Table 3.5.

Table 3.5 Measurement items for BI

Variable Name	Item No.	Item
BI	BI1	I intend to use the IH in the next three months.
	BI2	I predict I will use the IH in the next three months.
	BI3	I plan to use the IH in the next three months.

Source: Venkatesh et al. (2003)

3.3.6 Use behaviour (UB)

UB is a critical variable in information systems research, as it directly reflects an individual's actual use of information technology or systems. F. D. Davis (1989), when proposing the TAM, initially defined UB as the actual behaviour of individuals adopting information technology. This concept was later widely accepted and employed in empirical research across various information systems.

Venkatesh et al. (2012) measured use behaviour in their study by assessing the frequency of use, defining the range of frequency from "never" to "multiple times a day." This measurement method provides a quantitative way to evaluate the extent of users' engagement with technology.

Alam et al. (2020), in their study of the factors influencing the adoption of mobile health services in households in Guangdong Province, adopted the research methods of Venkatesh et al. (2012) and Taylor and Todd (1995). They measured UB through dimensions such as user perceptions, usage expectations, duration of mobile health usage, and frequency of use, constituting a comprehensive assessment of user behaviour. Meanwhile, Zhou et al. (2021), in their study of Guangdong Province consumers' intentions to use live electronic commerce shopping, measured usage behaviour using three dimensions: usage choice, following usage, and recommending the technology to others. These dimensions consider not only the user's

personal use of the technology but also the social influence of the technology, that is, how users affect others' adoption of the technology.

The use behaviour in this study refers to doctors' actual use of IH in Guangdong Province. The measurement of use behaviour in this study will be conducted using the measurement items from Venkatesh et al. (2012), as shown in Table 3.6.

Table 3.6 Measurement items for UB

Variable	Item No.	Item
UB	UB1	I never use IH (R)
	UB2	I use IH a few times per month.
	UB3	I use IH a few times per week.
	UB4	I use IH a few times per day.

(R) is used as a reverse item to assess the quality of questionnaire responses, and it should be scored in the opposite direction during scoring.

Source: Venkatesh et al. (2012)

3.3.7 Empathy

Empathy refers to an individual's capacity for cognitive and emotional responses to the experiences of others. This ability enables individuals to understand others' feelings from their perspective and to generate corresponding emotional reactions. M. H. Davis (1983) defined empathy by emphasizing its dual dimensions: the cognitive dimension of understanding others (perspective-taking) and the emotional dimension of empathic concern.

The Interpersonal Reactivity Index, developed by M. H. Davis (1980), is a significant tool for assessing an individual's level of empathy. It comprises four dimensions: the Fantasy Scale, which measures an individual's capacity for empathizing with fictional characters in their imagination; the Perspective-Taking Scale, which evaluates an individual's ability to think from others' viewpoints in real-life situations; the Empathic Concern Scale, which assesses the natural sympathetic response of an individual to the plights of others; and the Personal Distress Scale, which measures an individual's discomfort when confronted with the suffering of others.

In their research, Dietz and Kleinlogel (2014) explored the relationship between managerial empathy and salary cuts. They condensed Davis's scale, selecting ten core items for empirical analysis, and found that empathy can act as a moral force influencing employees' compliance with organizational authority, especially when the organization requires employees to take pay cuts. Subsequently, Tian and Robertson (2019) used the abbreviated version of the empathy scale by Dietz and Kleinlogel (2014) in their study. They discovered that employees' perceptions of corporate social responsibility influence their pro-environmental behaviour through organizational identification, which is particularly pronounced among employees with high levels of empathy. Furthermore, the research by L. Liu et al. (2023) focused on the empathy

of the Chief Information Officer (CIO) and Chief Executive Officer (CEO) and how this empathy affects their relationship and the company's digital transformation. The results indicated that a CIO's empathy can improve the relationship with the CEO, thereby facilitating the success of digital transformation.

In this study, empathy refers to the extent to which doctors can understand and share the feelings of patients regarding their need to use IH. This study will reference the research of Dietz and Kleinlogel (2014), Tian and Robertson (2019), L. Liu et al. (2023) to establish the measurement items for Empathy in this research, as shown in Table 3.7.

Table 3.7 Measurement items for Empathy

Variable	Item No.	Item
Empathy	EM1	Sometimes, I find it difficult to take the perspective of others. (R)
	EM2	To better understand others, I sometimes try to imagine myself in their place.
	EM3	When I am upset with someone, I usually try to put myself in his or her shoes.
	EM4	Before criticizing someone, I try to imagine how I would feel if I were in his or her position.
	EM5	I often think about being kind to and caring for people who are less fortunate than me.
	EM6	Sometimes, I do not feel very sad when others are going through a hard time. (R)
	EM7	When I see others being taken advantage of, I feel the need to protect them.
	EM8	Other people's misfortunes usually do not bother me very much. (R)
	EM9	Sometimes, when I see others being treated unfairly, I do not feel very sympathetic toward them. (R)
	EM10	I am often moved by what happens around me.

(R) is used as a reverse item to assess the quality of questionnaire responses, and it should be scored in the opposite direction during scoring.

Source: Dietz and Kleinlogel (2014), Tian and Robertson (2019), L. Liu et al. (2023)

3.4 Data collection

The research data for this study were collected through questionnaire surveys, ensuring that the selection of respondents and the method of questionnaire distribution contribute to the scientific validity and rationality of the data analysis in the later stages of the research.

3.4.1 Selection of questionnaire recipients

To ensure the practicality and scientific validity of the research results, this study adopted a convenience sampling method to select the questionnaire respondents. The study aims to validate the impact of the UTAUT model and empathy on the acceptance and use of IH by doctors in Guangdong Province. Therefore, the initial respondents selected were doctors from Guangdong Province.

As one of the most economically developed provinces in China, Guangdong holds a

significant position in terms of medical resources and healthcare service levels nationwide. With a permanent population exceeding 126 million, there is a substantial demand for medical services. According to the latest statistics, there are a total of 320,923 doctors in Guangdong Province, with the highest concentration in the Pearl River Delta area, accounting for 213,703 doctors; followed by 40,337 doctors in Northern Guangdong; 32,079 in Eastern Guangdong; and 34,804 in Western Guangdong. The geographical distribution and diversity in the number of doctors provide a rich data source for this study.

Guangdong Province is divided into 21 prefecture-level cities, categorized into four regions: Eastern Guangdong, Western Guangdong, Northern Guangdong, and the Pearl River Delta. These regions not only differ in geographical locations but also vary in medical resource allocation, working environments for doctors, and service demands.

The criteria for selecting the doctors included:

1. Representation from hospitals in Guangdong Province.
2. Accessibility and willingness to participate.
3. Diversity in demographics (gender, age, professional title, years of experience).

Through this convenience sampling method, although it may limit the generalizability of the research results, it effectively collects data from doctors of different regions and professional titles in Guangdong Province. This preliminary analysis of the factors influencing the acceptance of IH not only helps understand the attitudes and behaviors of doctors in Guangdong towards IH but also provides empirical evidence to promote the development of IH. It is important to note that convenience sampling might introduce certain biases. Since the sample is not randomly selected, the results may not fully represent the entire population of doctors in Guangdong Province. The findings should be interpreted with caution, considering these potential limitations.

3.4.2 Mode of questionnaire distribution

When conducting a survey, choosing an appropriate distribution mode is crucial for ensuring the effectiveness and efficiency of the research. Given the vast geographical expanse and complex population distribution of Guangdong Province, traditional methods of distributing and collecting paper questionnaires would face numerous challenges, such as high costs, lengthy timelines, and low response rates. Therefore, this study has opted for a more modern and efficient electronic questionnaire distribution method.

With the continuous advancement and development of the Internet in China, online surveys have become a standard and streamlined research method (Shao & Xie, 2021). Electronic

questionnaires offer several advantages, including but not limited to the ability to quickly reach a broad audience and a fast process for completion and submission, significantly shortening the data collection cycle. Electronic questionnaires save on printing, mailing, and labour costs compared to paper questionnaires. The data from electronic questionnaires can be directly imported into databases, facilitating subsequent data organization, analysis, and storage. Electronic questionnaires also reduce paper use, making them more environmentally friendly. This study will distribute electronic questionnaires through "Questionnaire Star" online platform. Researchers will ensure the widespread dissemination of the questionnaire link to cover the doctors across different regions of Guangdong Province.

Before distributing the questionnaire, we will use informed consent forms to communicate the purpose of the research, its content, the estimated time required, and the voluntary nature of participation in the survey to the respondents. After being fully informed about the content and purpose of the survey, respondents will independently decide whether to participate in the study. The electronic questionnaire system will be set up with appropriate options to ensure that it respects the respondents' choices, allowing access to the questionnaire filling page only after respondents agree to participate by clicking the "Agree" button.

We will conduct this survey anonymously to encourage respondents to complete the questionnaire truthfully and to protect their privacy. The questionnaire will not collect personally identifiable information, such as names or identification numbers. All data will be kept confidential and used solely for research and analysis.

This study will efficiently and economically collect data on the acceptance of IH among doctors in Guangdong Province by utilizing electronic questionnaires, providing a reliable foundation for the research.

3.4.3 Quantity of questionnaires

Various potential issues were already considered during the questionnaire design phase to ensure the reliability and validity of the research data, and corresponding measures were taken to improve the quality of the questionnaires. According to M. Wu (2009), the optimal sample size for structural equation modelling lies between 200 and 500. Therefore, this study has set a minimum of 350 valid questionnaires based on the research objectives and the statistical analysis requirements. Considering that this study employed an online survey and included reverse-coded questions to avoid potentially invalid questionnaires, 1,145 questionnaires were collected.

Quality control measures for the questionnaire included reverse scoring items, a common

psychometric technique used to identify and eliminate participants who may fill out the questionnaire randomly or without due diligence. In this study, we included a total of six reverse-scoring items. We designed these items to detect questionnaires that show inconsistent or logically contradictory answering patterns. For example, if a participant indicates that they never use IH on one item but use it every month on another item, we would identify such contradictory responses and consider the questionnaire invalid.

The questionnaire cleaning process is crucial as it ensures that the data used for the final analysis is authentic and reliable. First, we eliminated questionnaires where all items were marked with the same score, as this could indicate that the participants needed to engage with the content of the questions truly. Second, we discarded questionnaires with conflicting answers between reverse-scored and positively scored items.

After completing the data cleaning steps, we obtained 359 valid questionnaires, resulting in a validity rate of 31.35%. This rate is acceptable in social science research, especially when using online survey methods. The geographical distribution of the valid questionnaires showed that the Pearl River Delta region yielded the most valid responses, which is consistent with the fact that this region has the highest number of registered doctors. The study required more valid questionnaires from Guangdong's eastern, northern, and western parts. However, compared to the number of registered doctors in each region, the proportions also showed reasonable.

This study has ensured the quality of data collection through meticulous questionnaire design and cleaning processes, providing a solid foundation for subsequent data analysis and research conclusions. The distribution of valid questionnaires is shown in Table 3.8.

Table 3.8 Number of valid questionnaires

Region	Frequency	Percentage	Number of Doctors	Percentage
Northern Guangdong	37	10.31%	40,337	12.57%
Eastern Guangdong	63	17.55%	32,079	10.00%
Western Guangdong	31	8.64%	34,804	10.84%
Pearl River Delta	228	63.51%	213,703	66.59%

3.4.4 Data analysis methods

Structural Equation Modelling (SEM) is an advanced statistical analysis technique that allows researchers to examine multiple equation systems simultaneously, thereby assessing the complex relationships between variables. SEM's strength lies in its ability to test causal relationships and conduct path analysis within a comprehensive model simultaneously, which is very helpful for understanding the direct and indirect effects between variables. Additionally, SEM supports the analysis of latent variables, measured by multiple observed indicators, thus

providing precise estimates of abstract concepts (Dash & Paul, 2021).

In SEM, the evaluation of the model typically includes two main components: the measurement model and the structural model. The measurement model involves assessing the relationships between observed and latent variables, which helps to determine the reliability and validity of the various items in a questionnaire. On the other hand, the structural model involves assessing the relationships between latent variables, which aids in understanding the causal relationships between variables (M. Wu, 2009).

Covariance-based SEM (CB-SEM) and variance-based Partial Least Squares SEM (PLS-SEM) represent the commonly used approaches in structural equation modelling. CB-SEM is more suitable for model validation and theory testing, focusing on the fit of the theoretical model and hypotheses testing. Conversely, PLS-SEM is more appropriate for exploratory research and developing complex models, emphasizing prediction and the model's explanatory power (Hair et al., 2017).

This study opts to use CB-SEM because the research objective is to validate an existing theoretical model and test the relationships between hypotheses. The CB-SEM analysis process typically includes model specification, model estimation, assessment of model fit, and interpretation of path coefficients. Commonly used CB-SEM analysis software includes AMOS, Mplus, and LISREL, which offer rich graphical interfaces and data modelling tools, enabling researchers to construct and evaluate models intuitively.

In this study, we will use AMOS 26 software for SEM analysis. AMOS offers a user-friendly interface that allows researchers to construct models through a drag-and-drop method and provides a variety of fit indices to assess the quality of the model. Additionally, AMOS supports bootstrapped path analysis, which aids researchers in understanding the direct, indirect, and total effects within the model. This study will also employ SPSS 25 statistical software for descriptive statistical analysis.

In summary, this study leveraged the powerful capabilities of both AMOS 26 and SPSS 25 software to conduct a comprehensive and in-depth data analysis, thereby ensuring the accuracy and reliability of the research findings.

3.5 Ethical review

Researchers must ensure the ethical nature of research involving human participants before undertaking any such study. Ethical review is not only a matter of respect and protection for the participants but also an essential safeguard for the quality of scientific research. Therefore, prior

to the initiation of this study, the research proposal, informed consent forms, and questionnaire content were thoroughly submitted to the Medical Ethics Committee of the Third Affiliated Hospital of Sun Yat-sen University for review.

The review process conducted by the ethics committee is thorough and meticulous, involving an assessment of the scientific validity and rationality of the research design and a review of the measures in place to protect the rights and interests of the participants. The scientific review ensures that the study design can effectively answer the research questions without subjecting participants to unnecessary risks. The ethical review, on the other hand, ensures that the rights and welfare of participants are respected and protected throughout the research process, including but not limited to the protection of privacy, the acquisition of informed consent, and the minimization of any potential risks to the participants.

The informed consent form is a critical component of the ethical review process. It details the purpose, procedures, potential risks, and benefits of the study, as well as the rights of the participants, including the right to withdraw from the study at any time. This study ensures that all participants fully understand the research content and participate voluntarily before involvement. The questionnaire's content has been carefully reviewed to ensure that the questions do not infringe upon the participants' privacy or cause unnecessary psychological stress.

After obtaining approval from the ethics committee, this study began with data collection. Throughout the research, the researchers strictly adhered to the ethical guidelines and recommendations set forth by the ethics committee. We implemented appropriate data protection measures, such as using anonymous or de-identified data, to safeguard the participants' personal information. At the same time, we ensured that all data handling and storage complied with relevant data protection regulations and standards.

In summary, the study's strict adherence to ethical standards demonstrates our commitment to respecting the participants and ensures the legitimacy and social acceptability of the research findings. This commitment enables us to conduct high-quality scientific research while protecting individual rights.

3.6 Chapter summary

As an integral part of the research, this section follows the literature review presented in the previous chapters and builds upon it to construct the theoretical framework for this study. Through an in-depth analysis of the existing literature, we have proposed a comprehensive

theoretical model to explore the key variables and their interactions with the research question. Based on the theoretical model, we have further developed a series of research hypotheses that will be tested using empirical data.

This chapter elaborates on the data collection method to validate these hypotheses. We have chosen the questionnaire survey as the primary tool for data collection because it efficiently gathers large volumes of data and is suitable for quantitative analysis. We carefully planned the questionnaire design process to ensure the collected data would effectively test the research hypotheses. The questionnaire structure was thoughtfully conceived to facilitate participants' understanding and response and simplify subsequent data analysis.

The designers paid particular attention to the configuration of the scale items in the questionnaire. Each item is intended to measure specific constructs within the theoretical model precisely. We employed previously validated scales to enhance their reliability and validity.

This chapter emphasizes respecting and protecting participants' ethical rights. All research activities were conducted after obtaining approval from the Medical Ethics Committee, ensuring the study's ethical compliance. The research team strictly implemented the informed consent process, safeguarding the participants' voluntariness and right to information.

Regarding the specifics of data collection, this chapter provides the number of questionnaires distributed, the number collected, and the number of valid questionnaires. These figures not only demonstrate the scale of the survey but also reflect the quality of the data and potential sample bias. The number of valid questionnaires forms the basis for subsequent data analysis.

Finally, this chapter provides a clear overview of the research method, laying a solid foundation for understanding the data analysis and research findings in subsequent chapters. Through the detailed description of these methods, we ensure the transparency and replicability of the study, which are crucial for the rigor and credibility of scientific research.

Chapter 4: Data Analysis

This chapter is the core of the research, detailing how to extract meaningful information from the collected data and verify the research hypotheses. We will explain further how we obtained valid questionnaire data for subsequent statistical analysis after rigorous data cleaning and preprocessing. This study ensures the accuracy and scientific nature of the analysis; we have chosen two powerful statistical software tools, SPSS 25 and AMOS 26. These software packages are widely recognized in the academic community and offer a range of complex statistical functions suitable for handling the data analysis needs of this research.

Firstly, we will conduct a descriptive statistical analysis of the sample data. This step provides a basic understanding of the sample, including its demographic characteristics. Subsequently, this chapter will delve into the analysis of reliability and validity. Finally, this chapter will employ SEM for hypotheses testing.

Through these analytical steps, this chapter will offer a clear and transparent data analysis process, ensuring the reliability and validity of the research findings. Moreover, this chapter will discuss the significance of the analysis results and their implications for existing theories and practices. This study aims to provide valuable insights and recommendations for academic research and practical operations in the relevant fields through these in-depth analyses.

4.1 Descriptive statistical analysis

In this study, we collected 359 valid questionnaires, which provided a solid foundation for our data analysis. We conducted a comprehensive descriptive statistical analysis using SPSS 25 statistical software to understand the sample's essential characteristics. This analysis aimed to reveal the sample's primary distribution, including key demographic variables such as gender, age, education level, work experience, and job title. The specific analysis results are detailed in Table 4.1.

Table 4.1 Descriptive statistical results of the sample

Variable	Option	Frequency	Percentage
Gender	Male	190	52.90%
	Female	169	47.10%
Age	21-30	125	34.80%
	31-40	127	35.40%

Variable	Option	Frequency	Percentage
	41-50	67	18.70%
	51 and above	40	11.10%
Education level	Bachelor's degree	144	40.10%
	Master's degree	104	29.00%
	Doctorate	111	30.90%
Work experience	Less than one year	51	14.20%
	1-5 year	94	26.20%
	6-10 years	65	18.10%
	11-15 years	51	14.20%
	16-20 years	44	12.30%
	Over 20 years	54	15.00%
Title	Resident doctor	127	35.40%
	Attending doctor	81	22.60%
	Associate chief doctor	79	22.00%
	Chief doctor	72	20.10%

From the descriptive statistical analysis results of the sample presented in Table 4.1, we can observe the following characteristics:

Gender distribution: In this survey, male participants accounted for 52.9%, totaling 190 individuals, while female participants comprised 47.10%, totaling 169 individuals. This gender ratio, when compared with the gender proportion of doctors in Guangdong Province provided by the Health Commission of Guangdong Province (2022), shows that the gender distribution of our sample is relatively close to that of the doctor population in Guangdong Province.

Age structure: Regarding the age distribution, respondents aged 21-30 accounted for 34.80%, those aged 31-40 comprised 35.40%, those aged 41-50 made up 18.70%, and those aged 51 and above constituted 11.10%. Compared to the age distribution of doctors in Guangdong Province, our sample's proportion of younger doctors is slightly higher, which may be related to the survey's target group or the survey method.

Educational Level: Regarding educational attainment, respondents with a bachelor's degree represented 40.10%, those with a master's degree accounted for 29.00%, and those with a doctoral degree comprised 30.90%. Compared to the educational distribution of doctors in Guangdong Province, the proportion of doctors with higher educational qualifications in our sample is higher, which may reflect a greater intention to participate in this survey among highly educated doctors.

Work Experience: The distribution of work experience shows that respondents with 1-5 years of experience account for 26.20%, those with 6-10 years for 18.10%, those with 11-15 years for 14.20%, those with 16-20 years for 12.30%, and those with over 20 years of experience for 15%. Compared to the distribution of work experience among doctors in

Guangdong Province, the distribution in our sample is more balanced, which can better reflect the situation of doctors with different lengths of service.

Professional Title Distribution: Regarding professional titles, resident doctor makes up 35.40%, attending doctor accounts for 22.60%, associate chief doctor represents 22.00%, and chief doctor comprises 20.10%. Compared to the distribution of professional titles among doctors in Guangdong Province, the proportion of doctors with senior titles in our sample is slightly higher. It may be related to the survey design or the level of interest in the research topic among senior doctors.

By comparing with the actual situation of doctors in Guangdong Province, we can see that the distribution of the sample in this survey in terms of gender, age, educational level, work experience, and professional title essentially matches the overall situation of doctors in Guangdong Province. It indicates that the sample of this questionnaire survey is representative, providing a reliable demographic foundation for our research results. Such sample representativeness helps ensure that our research findings can be better generalized to the doctor population in Guangdong Province and even more broadly, thereby enhancing the study's external validity.

4.2 Reliability and validity analysis

When conducting quantitative research, ensuring that the measurement tools used have high reliability and validity is crucial. Reliability refers to the ability of a measurement tool to produce consistent and stable results. In contrast, validity indicates how well a measurement tool measures the concept it intends to measure (Mark et al., 2016). If one validates a questionnaire in both these aspects, then the data it collects can be considered reliable and valid, providing a solid foundation for subsequent data analysis and interpretation.

4.2.1 Reliability and factor loading analysis

Reliability analysis is a critical step in quantitative research, with the primary goal of ensuring the reliability of questionnaire data. This process involves checking whether respondents have answered questions truthfully, thereby assessing the authenticity of the data. Reliability analysis commonly employs Cronbach's alpha coefficient as a measure, the most frequently used indicator of internal consistency reliability, with values ranging from 0 to 1. The level of Cronbach's alpha directly reflects the correlation between questionnaire items: the higher the coefficient, the better the consistency among items, and thus the higher the reliability of the

data. According to the research by Baldi et al. (2022), a Cronbach's alpha value above 0.7 is generally considered acceptable for questionnaire reliability. In this study, the reliability analysis results are shown in Table 4.2, which displays Cronbach's alpha coefficients for each variable.

Table 4.2 Reliability and factor loading

Variable	Item	Standardized loading	Cronbach's alpha
PE	PE4	0.666	0.856
	PE3	0.870	
	PE2	0.914	
	PE1	0.834	
EE	EE4	0.879	0.933
	EE3	0.906	
	EE2	0.886	
	EE1	0.858	
SI	SI4	0.797	0.902
	SI3	0.784	
	SI2	0.876	
	SI1	0.891	
FC	FC4	0.848	0.745
	FC3	0.421	
	FC2	0.822	
	FC1	0.732	
UB	UB4	0.837	0.901
	UB3	0.959	
	UB2	0.902	
	UB1	0.653	
Empathy	EM10	0.777	0.933
	EM9	0.630	
	EM8	0.651	
	EM7	0.812	
	EM6	0.668	
	EM5	0.848	
	EM4	0.811	
	EM3	0.836	
	EM2	0.862	
	EM1	0.771	
BI	BI3	0.931	0.968
	BI2	0.981	
	BI1	0.952	

Factor loading analysis is an essential component of Confirmatory Factor Analysis (CFA), which measures the weight of individual items on their corresponding latent variables (also known as "factors"). The higher the factor loading value, the more significantly the item reflects the measured construct. M. Wu (2009) suggests that ideal factor loading values should range between 0.5 and 0.95 to ensure the validity of the construct. In this study, we used AMOS 26 software to calculate the factor loadings for each questionnaire item, and the results are also presented in Table 4.2.

Based on the data from Table 4.2, we can observe that Cronbach's alpha coefficients for the

variables in this study range from 0.745 to 0.968, all above the standard of 0.7. It indicates that the questionnaire variables have good internal consistency, thus possessing a high level of reliability. However, we also note that the factor loading for FC3 is below 0.5, suggesting that this item needs to be sufficiently effective in reflecting its corresponding construct. Following M. Wu's (2009) recommendation to improve the overall validity of the questionnaire, we have decided to remove the FC3 item with a factor loading below 0.5 from the questionnaire.

After removing item FC3, we conducted a reliability re-analysis and recalculated the factor loadings to assess the adjusted structure of the questionnaire. This step enhances the questionnaire's overall reliability and ensures that each construct is effectively reflected by its items, thereby strengthening the questionnaire's overall validity. Through this rigorous analysis and adjustment process, we ensure that the questionnaire's measurement tools can provide reliable and valid data for subsequent data analysis.

The adjusted factor loadings and Cronbach's alpha coefficients for each construct are presented in Table 4.3. After removing item FC3, the Cronbach's alpha coefficient for the facility conditions construct increased to 0.839 from its original level. This result indicates that the adjusted construct has significantly improved internal consistency, reflecting that the remaining items have higher homogeneity when measuring the construct. The increase in Cronbach's alpha coefficient not only strengthens our confidence in the reliability of the questionnaire but also implies that the reliability of the questionnaire data has been enhanced, thereby providing a more solid foundation for subsequent data analysis.

Table 4.3 Adjusted reliability and factor loadings

Variable	Item	Standardized loading	Cronbach's alpha
PE	PE4	0.666	0.856
	PE3	0.870	
	PE2	0.914	
	PE1	0.834	
EE	EE4	0.879	0.933
	EE3	0.906	
	EE2	0.886	
	EE1	0.858	
SI	SI4	0.796	0.902
	SI3	0.783	
	SI2	0.877	
	SI1	0.892	
FC	FC4	0.844	0.839
	FC2	0.824	
	FC1	0.736	
UB	UB4	0.838	0.901
	UB3	0.959	
	UB2	0.902	
	UB1	0.652	
EM	EM10	0.777	0.933

Variable	Item	Standardized loading	Cronbach's alpha
BI	EM9	0.630	0.968
	EM8	0.651	
	EM7	0.812	
	EM6	0.668	
	EM5	0.848	
	EM4	0.811	
	EM3	0.836	
	EM2	0.862	
	EM1	0.771	
	BI3	0.931	
	BI2	0.981	
	BI1	0.952	

4.2.2 Validity analysis

Researchers use validity analysis to assess whether a research instrument accurately measures the intended constructs. In quantitative research, CFA is a commonly used method for testing validity. It is employed to verify whether the relationships between observed and latent variables conform to theoretical expectations as hypothesized by the researcher. In essence, CFA assists researchers in determining whether items effectively capture the conceptual information of the research variables or dimensions (M. Wu, 2009). This analytical process not only evaluates the strength of the association between each item and its corresponding construct but also examines the structural validity of the entire measurement model.

When conducting Confirmatory Factor Analysis, researchers must evaluate multiple fit indices to determine the model's goodness of fit. These indices include the chi-square to degrees of freedom ratio (χ^2/df), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Normed Fit Index (NFI), the Incremental Fit Index (IFI), and the Tucker-Lewis Index (TLI). M. Wu (2009) noted that a χ^2/df value less than three generally indicates an acceptable model fit to the sample data. McDonald and Ho (2002) suggested that an RMSEA value less than or equal to 0.08 indicates an acceptable model fit. Hu and Bentler (1999) proposed that the model's fit is reasonable when the CFI, NFI, IFI, and TLI values exceed 0.9.

4.2.2.1 Fit analysis

We first conducted a Confirmatory Factor Analysis in this study to assess the model's initial fit. The model's preliminary fit results are presented in Table 4.4.

Table 4.4 Preliminary fit results of confirmatory factor analysis

Indicators	χ^2/df	RMSEA	CFI	NFI	IFI	TLI
Test Result	3.666	0.086	0.896	0.863	0.897	0.884

The model's preliminary fit results indicate that the congruence between the sample data and the hypothesized model is not ideal. To improve the model's fit, we referred to the measurement model modification method proposed by M. Wu (2009) and adjusted the model using the Modification Indices (MI) value correction method.

In this study, we established correlations between the residuals of empathy dimensions e30 and e31, e25 and e26, e25 and e28, e27 and e29, as well as e26 and e28; within the usage behaviour dimension, they correlated e20 with e22; within the social influence dimension, they correlated e11 with e12; and within the facilitating conditions residuals, they correlated e15 with e16. The revised model included the addition of covariances between the error above variables. The error variables linked through covariances were all under the same measurement dimension. This is because the errors in respondents' understanding and cognition of the same variable may have a covariance relationship (M. Wu, 2009). The specific adjustments made are shown in Table 4.5.

Table 4.5 MI Modification contents

Correlation			MI	Par Change
e30	<—>	e31	111.494	0.143
e11	<—>	e12	63.124	0.092
e25	<—>	e26	58.86	0.259
e20	<—>	e22	30.048	-0.105
e27	<—>	e29	22.580	0.068
e15	<—>	e16	22.265	0.062
e26	<—>	e28	22.062	0.133
e25	<—>	e28	33.240	0.151

Following the adjustments above, the fit of the revised model is presented in Table 4.6. According to the adjusted results, $\chi^2/df=2.648<3$, RMSEA=0.068<0.08, CFI=0.937>0.9, NFI=0.903>0.9, IFI=0.937>0.9, TLI=0.928>0.9; all of these indices meet the criteria for a good model fit. These results indicate that the adjusted model has a better statistical fit, thereby validating the structural validity of the measurement model and ensuring that the research instrument can effectively measure the intended constructs.

Table 4.6 Fit indices

Indicators	χ^2/df	RMSEA	CFI	NFI	IFI	TLI
Test Result	2.648	0.068	0.937	0.903	0.937	0.928

4.2.2.2 Convergent validity

Composite Reliability (CR) and Average Variance Extracted (AVE) are two key indicators used in structural equation modelling to assess the reliability and validity of a model's measurements. The CR value measures the internal consistency of indicators, reflecting the correlation among the measurement indicators of a latent variable. A CR value above 0.7 is generally acceptable,

indicating that the model has good internal quality, meaning that the indicators are statistically consistent and can measure the same concept consistently. The AVE value measures the ratio of the variance explained by the indicators of a latent variable to the variance due to measurement error. It is an indicator of the construct's convergent validity. When the AVE value is more significant than 0.5, it means that the variance explained by the indicators of the latent construct exceeds the variance caused by measurement error, indicating that the measurement indicators can effectively reflect the latent construct they represent. In practice, if a model usually meets the criteria of a CR value greater than 0.7 and an AVE value greater than 0.5, the model has good convergent validity (M. Wu, 2009). He suggests that the indicators in the model can adequately and consistently reflect the characteristics of their underlying constructs, thereby providing a reliable foundation for subsequent causal relationship analysis.

In Table 4.7, the range of CR values is from 0.8441 to 0.9688, far above the threshold of 0.7, indicating that the model has excellent internal quality. At the same time, the range of AVE values is from 0.5943 to 0.9118, all exceeding the standard of 0.5, which further confirms that the model's convergent validity is good. These results suggest that the selected measurement indicators effectively reflect their corresponding latent constructs, providing strong evidence for the credibility and validity of the model.

Table 4.7 The indicators of convergent validity

Variable	Item	Estimate	Standard Error	Critical Ratio.	<i>p</i>	CR	AVE
PE	PE4	0.666				0.8948	0.6829
	PE3	0.870	0.06	14.394	***		
	PE2	0.914	0.061	14.923	***		
	PE1	0.834	0.056	13.905	***		
EE	EE4	0.879				0.9336	0.7787
	EE3	0.906	0.045	25.221	***		
	EE2	0.886	0.046	24.049	***		
	EE1	0.858	0.049	22.514	***		
SI	SI4	0.796				0.9041	0.7029
	SI3	0.783	0.061	16.488	***		
	SI2	0.877	0.066	19.215	***		
	SI1	0.892	0.065	19.683	***		
FC	FC4	0.844				0.8441	0.6443
	FC2	0.824	0.044	18.858	***		
	FC1	0.736	0.041	15.938	***		
UB	UB4	0.838				0.9079	0.7152
	UB3	0.959	0.044	24.935	***		
	UB2	0.902	0.045	22.599	***		
	UB1	0.652	0.044	13.831	***		
EM	EM10	0.777				0.9354	0.5943
	EM9	0.63	0.071	12.433	***		
	EM8	0.651	0.077	12.918	***		
	EM7	0.812	0.063	16.879	***		

Variable	Item	Estimate	Standard Error	Critical Ratio.	<i>p</i>	CR	AVE
	EM6	0.668	0.066	13.305	***		
	EM5	0.848	0.057	17.849	***		
	EM4	0.811	0.057	16.855	***		
	EM3	0.836	0.057	17.538	***		
	EM2	0.862	0.051	18.233	***		
	EM1	0.771	0.06	15.823	***		
	BI3	0.931					
BI	BI2	0.981	0.025	41.74	***	0.9688	0.9118
	BI1	0.952	0.027	36.765	***		

*** indicates statistical significance with $p < 0.001$

Furthermore, the high values of these statistical indicators also suggest that the model possesses a high level of predictive accuracy, which is crucial for empirical research. It is because only when the model's measurement indicators accurately reflect the latent constructs can researchers effectively test the hypothesized causal relationships within the model. Therefore, high values of CR and AVE imply good internal quality of the model and indicate a higher reliability and generalizability of the research findings, providing solid statistical support for the study's conclusions.

4.2.2.3 Discriminant Validity

Discriminant Validity is an essential aspect of construct validity, involving the independence between different constructs. Specifically, discriminant validity refers to the notion that a construct should exhibit low associations with other constructs, indicating that they represent different concepts and traits. If a construct correlates highly with other constructs, this correlation implies that these constructs may be measuring the same or overlapping concepts, which leads to insufficient discriminant validity. Ensuring discriminant validity is crucial in empirical research, as it directly relates to the clarity and explanatory power of the relationships between variables in the research model. To test for discriminant validity, researchers typically employ the Chi-square difference test. This method evaluates discriminant validity by comparing the fit of the original model, which assumes that the constructs are independent, to the fit of an alternative model that hypothesizes two constructs as a single construct (M. Wu, 2013).

We conducted a thorough examination of discriminant validity, and the results were quite significant. Specifically, we employed the method proposed by M. Wu, (2013), which involves artificially merging two distinct constructs—conceptually independent concepts or variables—within the original model framework into a single construct, and then observing the impact of this amalgamation on the overall model fit. The model fit was assessed using a battery of statistical indices, including the chi-square value (χ^2), CFI, and RMSEA. These indices

collectively serve as the criteria for evaluating the adequacy of model fit, where a lower chi-square value, a CFI closer to 1, and a smaller RMSEA all indicate a better fit of the model.

In our experiments, each merger of two constructs resulted in a decline in all these fit indices. More importantly, this decline in fit was not random or marginal but was substantiated by a stringent statistical test—the chi-square difference test—with a significance level reaching 0.001. This indicates that the decrease in model fit after merging constructs is statistically significant and unlikely to be due to random error. In other words, the constructs in the original model are statistically distinguishable, with each playing a unique and irreplaceable role.

This finding is of great importance to our research. Firstly, it confirms the independence of the constructs within our model, which is a fundamental requirement for building theoretical models. Secondly, the establishment of discriminant validity lends credibility to the theoretical foundation of the model, as it demonstrates that our model can accurately reflect the differences between concepts in the real world. Lastly, this clear discriminant validity provides a solid basis for subsequent hypothesis testing. If the constructs were not clearly distinguishable, any hypothesis tests regarding the relationships between these constructs could be inaccurate. Therefore, our research has established a robust and reliable theoretical framework prior to conducting hypothesis testing. The results of the discriminant validity tests are presented in Table 4.8.

Table 4.8 The results of the discriminant validity

No.	Model	χ^2	df	χ^2/df	NFI	CFI	RMSEA	Model Comparison	$\Delta\chi^2$	Δdf
1	Original Model	1623.82	442	3.666	0.863	0.896	0.086			
2	Six-factor Model 1	1835.581	449	4.088	0.845	0.878	0.093	2 vs1	211.761***	7
3	Six-factor Model 2	1804.333	449	4.019	0.848	0.881	0.092	3 vs1	180.513***	7
4	Six-factor Model 3	1724.433	449	3.841	0.855	0.888	0.089	4 vs1	100.613***	7
5	Six-factor Model 4	1764.088	449	3.929	0.851	0.884	0.09	5 vs1	140.268***	7
6	Six-factor Model 5	2039.912	449	4.543	0.828	0.860	0.099	6 vs1	416.092***	7
7	Six-factor Model 6	2549.235	450	5.665	0.785	0.815	0.114	7 vs1	925.415***	8
8	Five-factor Model 1	2016.049	454	4.441	0.830	0.862	0.098	8 vs1	392.229***	12
9	Five-factor Model 2	1942.528	454	4.279	0.836	0.869	0.096	9 vs1	318.708***	12
10	Five-factor Model 3	2162.929	454	4.764	0.818	0.850	0.103	10 vs1	539.109***	12
11	Five-factor Model 4	2166.025	454	4.771	0.817	0.849	0.103	11 vs1	542.205***	12
12	Five-factor Model 5	3567.775	454	7.859	0.699	0.726	0.138	12 vs1	1943.955***	12
13	Four-factor Model 1	2173.347	458	4.745	0.817	0.849	0.102	13 vs1	549.527***	16
14	Four-factor Model 2	2598.843	458	5.674	0.781	0.811	0.114	14 vs1	975.023***	16
15	Four-factor Model 3	2548.101	458	5.564	0.785	0.816	0.113	15 vs1	924.281***	16
16	Four-factor Model 4	3679.926	458	8.035	0.690	0.716	0.140	16 vs1	2056.106***	16
17	Three-factor Model 1	3057.616	461	6.633	0.742	0.771	0.125	17 vs1	1433.796***	19
18	Three-factor Model 2	3274.899	461	7.104	0.724	0.752	0.131	18 vs1	1651.079***	19
19	Three-factor Model 3	3859.022	461	8.371	0.674	0.701	0.143	19 vs1	2235.202***	19
20	Two-factor Model 1	4078.008	463	8.808	0.656	0.682	0.148	20 vs1	2454.188***	21
21	Two-factor Model 2	4063.168	463	8.776	0.657	0.683	0.147	21 vs1	2439.348***	21
22	One-factor Model	4672.909	464	10.071	0.606	0.629	0.159	22 vs1	3049.089***	22

*** indicates statistical significance with $p < 0.001$

Six-factor Model 1: PE+EE, SI, FC, BI, UB, EM; Six-factor Model 2: PE, EE+SI, FC, BI, UB, EM; Six-factor Model 3: PE, EE, SI+FC, BI, UB, EM

Six-factor Model 4: PE, EE, SI, FC+BI, UB, EM; Six-factor Model 5: PE, EE, SI, FC, BI+UB, EM; Six-factor Model 6: PE, EE, SI, FC, BI, UB+EM

Five-factor Model 1: PE+EE+SI, FC, BI, UB, EM; Five-factor Model 2: PE, EE+SI+FC, BI, UB, EM; Five-factor Model 3: PE, EE, SI+FC+BI, UB, EM

Five-factor Model 4: PE, EE, SI, FC+BI+UB, EM; Five-factor Model 5: PE, EE, SI, FC, BI+UB+EM; Four-factor Model 1: PE+EE+SI+FC, BI, UB, EM

Four-factor Model 2: PE, EE+SI+FC+BI, UB, EM; Four-factor Model 3: PE, EE, SI+FC+BI+UB, EM; Four-factor Model 4: PE, EE, SI, FC+BI+UB+EM

Three-factor Model 1: PE+EE+SI, FC+BI, UB+EM; Three-factor Model 2: PE+EE, SI+FC++BI, UB+EM; Three-factor Model 3: PE+EE, SI+FC, BI+UB+EM

Two-factor Model 1: PE+EE+SI+FC, BI+UB+EM; Two-factor Model 2: PE+EE+SI, FC+BI+UB+EM; One-factor Model: PE+EE+SI+FC+BI+UB+EM

4.3 Path analysis

Path analysis was employed in this study to gain a deeper understanding of the causal relationships between variables, and a Structural Equation Model (SEM) was constructed using AMOS 26 software. The graphical representation of the model is presented in Figure 4.1, providing an intuitive view of the hypothesized relationships among the various variables.

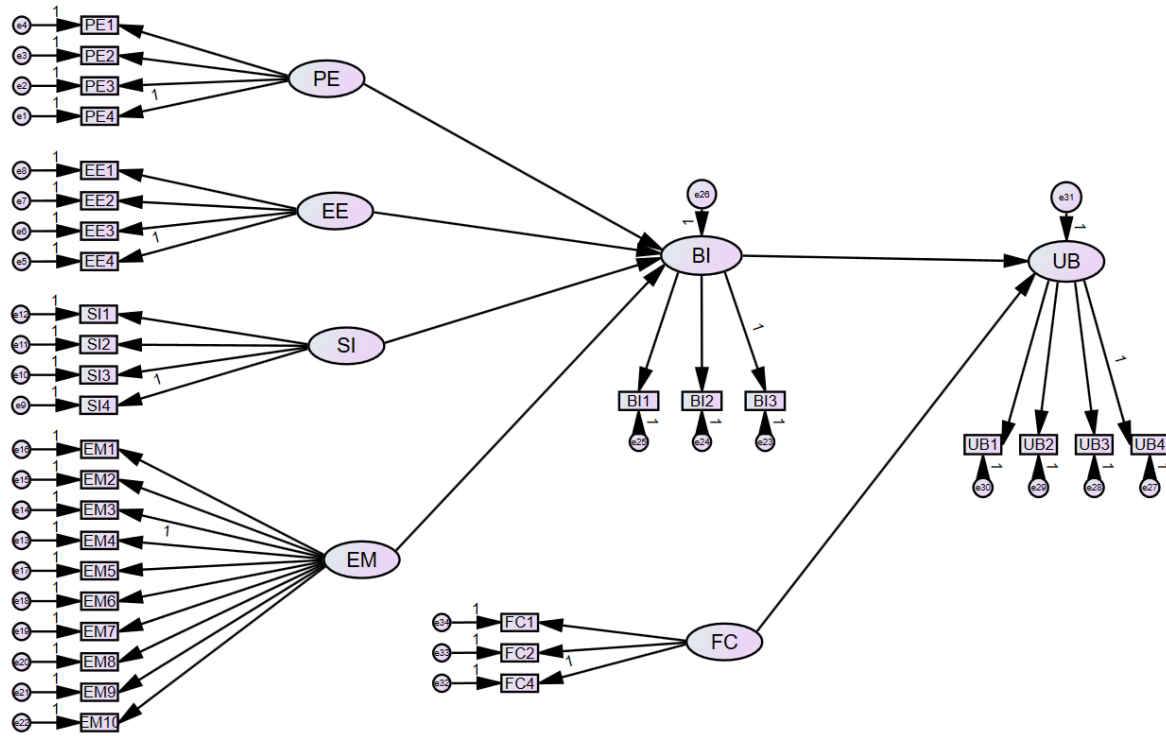


Figure 4.1 Structural equation model diagram

Before conducting path analysis, we performed a normality test on the dataset because parameter estimation in structural equation modelling typically relies on a multivariate normal distribution assumption. Table 4.9 presents the normality test results, which include the kurtosis values for each variable and the statistic for multivariate normality (Multivariate critical ration). The results indicate that the kurtosis values for variables FC1, SI3, SI4, PE1, and PE3 are all greater than 2, and the statistic for multivariate normality reached 127.409, far exceeding the commonly used critical values. The result indicated that the data does not satisfy univariate and multivariate normality. Non-normally distributed data in structural equation modelling may lead to abnormal inflation of the chi-square value, thereby affecting the accuracy of the model fit indices.

Table 4.9 Results of normality test

Variable	min	max	skew	critical ratio	kurtosis	critical ratio
FC1	1	5	-1.621	-12.537	2.556	9.885

FC2	1	5	-1.421	-10.99	1.706	6.597
FC4	1	5	-1.134	-8.773	0.901	3.485
UB1	1	5	-1.454	-11.249	1.586	6.134
UB2	1	5	-0.833	-6.444	-0.233	-0.902
UB3	1	5	-0.746	-5.769	-0.262	-1.015
UB4	1	5	-0.533	-4.125	-0.647	-2.504
BI1	1	5	-1.106	-8.552	0.57	2.204
BI2	1	5	-1.091	-8.442	0.468	1.81
BI3	1	5	-1.108	-8.574	0.569	2.2
EM10	1	5	-0.899	-6.958	-0.018	-0.071
EM9	1	5	-0.874	-6.762	0.239	0.925
EM8	1	5	-0.582	-4.499	-0.497	-1.92
EM7	1	5	-0.838	-6.485	0.229	0.887
EM6	1	5	-0.977	-7.56	0.911	3.525
EM5	1	5	-0.98	-7.577	0.341	1.319
EM1	1	5	-0.693	-5.357	-0.129	-0.497
EM2	2	5	-0.881	-6.813	-0.378	-1.461
EM3	1	5	-0.99	-7.661	0.778	3.008
EM4	1	5	-1.008	-7.797	0.757	2.926
SI1	1	5	-1.01	-7.813	0.577	2.233
SI2	1	5	-0.907	-7.017	0.181	0.699
SI3	1	5	-1.39	-10.755	2.362	9.134
SI4	1	5	-1.487	-11.505	2.446	9.459
EE1	1	5	-1.088	-8.413	0.972	3.76
EE2	1	5	-1.087	-8.407	0.843	3.26
EE3	1	5	-1.009	-7.808	0.706	2.73
EE4	1	5	-0.992	-7.673	0.798	3.085
PE1	1	5	-1.408	-10.892	2.743	10.609
PE2	1	5	-1.235	-9.553	1.416	5.478
PE3	1	5	-1.403	-10.849	2.419	9.357
PE4	1	5	-0.919	-7.108	0.11	0.427
Multivariate					627.353	127.409

The present study employed the Bollen-Stine Bootstrap method to adjust the chi-square values to address the non-normally distributed data affecting the accuracy of model fit indices. This method generates new sample distributions through resampling techniques and recalculates the chi-square values based on these distributions, resulting in more robust model estimates (Bollen & Stine, 1992). The adjusted model fit results are presented in Table 4.10. According to the results in the table, the adjusted model fit indices indicate a good fit: $\chi^2/df=1.58<3$, RMSEA=0.04<0.08, CFI=0.98>0.9, NFI=0.94>0.9, IFI=0.98>0.9, TLI=0.97>0.9, demonstrating excellent model fit.

Table 4.10 Results of model fit

Indicators	χ^2/df	RMSEA	CFI	NFI	IFI	TLI
Test Result	1.580	0.040	0.980	0.940	0.980	0.970

The path coefficients and their significance levels for the structural equation model are shown in Table 4.11.

Table 4.11 Results of path coefficient test in the model

Path relationships			Estimate	S.E.	C.R.	<i>p</i>
BI	←	PE	0.116	0.046	2.585	0.01
BI	←	EE	0.363	0.048	7.911	***
BI	←	SI	0.512	0.063	9.969	***
BI	←	Empathy	0.111	0.047	2.525	0.012
UB	←	FC	0.089	0.052	2.01	0.044
UB	←	BI	0.684	0.061	12.912	***

Analysis of Table 4.11 reveals that the standardized path coefficient from PE to BI is 0.116 ($p=0.01<0.05$), indicating that PE significantly positively affects BI. The standardized path coefficient from EE to BI is 0.363 ($p<0.001$), suggesting that EE significantly positively affects BI. The standardized path coefficient from SI to BI is 0.512 ($p<0.001$), demonstrating that SI significantly positively affects BI. Similarly, the standardized path coefficient from Empathy to BI is 0.111 ($p=0.012<0.05$), indicating that Empathy significantly positively affects BI. The standardized path coefficient from FC to UB is 0.089 ($p=0.044<0.05$), showing that FC has a significant positive correlation with UB. The standardized path coefficient from BI to UB is 0.684 ($p<0.001$), confirming that BI significantly positively affects UB.

4.4 Analysis of hypotheses testing results

Combining the analysis results obtained through SPSS 25 and AMOS 26 statistical software, we can see that the structural equation model has validated all six research hypotheses proposed in this study. PE, EE, SI, and Empathy positively influence doctors' intentions to use IH. FC positively affects doctors' use behaviour toward IH, and BI positively influences doctors' use behaviour toward IH. The results of the hypotheses testing are shown in Table 4.12.

Table 4.12 Results of hypotheses testing in the model

No.	Hypotheses	Result
H1	Performance expectancy positively affects doctors' intentions to use IH.	Support
H2	Effort expectancy positively affects doctors' intentions to use IH.	Support
H3	Social influence positively affects doctors' intentions to use IH.	Support
H4	Facilitating conditions positively affect doctors' actual use behaviour of IH.	Support
H5	Doctors' intentions to use IH positively affect their actual use behaviour.	Support
H6	Empathy positively affects doctors' intentions to use IH.	Support

Through empirical analysis, Hypothesis 1, which posits that PE positively affects doctors' intention to use IH, has been empirically supported, indicating that H1 is valid. This result aligns with previous research findings by Abbad (2021) and Venkatesh et al. (2003), which reflect that IH can enhance doctors' intentions to use such services by offering greater usefulness and efficiency in their work.

Hypothesis 2, which suggests that EE positively affects doctors' intention to use IH, has

also received empirical support, confirming that H2 is valid. This finding aligns with Abbad's (2021) and Venkatesh et al.'s (2003) research results. It indicates that the less effort doctors need to invest in learning to operate IH, the stronger their intention to use these online healthcare services.

Hypothesis 3, which asserts that SI positively affects doctors' intention to use IH, has also been empirically supported, thus confirming that H3 stands. This outcome is consistent with the findings of Al-Saedi et al. (2020) and Venkatesh et al. (2003), reflecting that the higher the level of approval for using IH from friends, family, or significant individuals or groups around the doctors, the greater the doctors' intentions to adopt IH.

Hypothesis 4, which suggests that FC positively affects doctors' actual use behaviour of IH, has also been empirically supported. This finding aligns with the research of Venkatesh et al. (2003), indicating that FC positively influence UB. It also implies that the stronger the behaviour of doctors using IH is when they have the necessary equipment, technological resources, and personal capabilities.

Hypothesis 5, which posits that doctors' BI to use IH positively affects their UB, has been supported by empirical evidence. This outcome is consistent with the findings of Venkatesh et al. (2003). It demonstrates that the degree of BI determines the doctors' use behaviour towards IH.

Hypothesis 6, which posits that Empathy positively affects doctors' intentions to use IH, has been supported by empirical evidence, thus confirming that H6 is valid. This result is in line with the findings of Malik et al. (2020), which suggest that Empathy enhances individuals' use of chatbots. It indicates that the more doctors can put themselves in their patient's shoes, demonstrating a higher level of Empathy, the greater they intend to use IH.

4.5 Chapter summary

In this chapter, we have conducted an in-depth empirical analysis based on the research method and data collection efforts described in Chapter 3. This step is crucial for verifying the research model's reliability and the hypotheses' validity.

Firstly, we used SPSS 25 software to perform a descriptive statistical analysis of the collected sample data. This analysis helped us depict the sample's essential characteristics, providing foundational information for understanding the sample structure and subsequent analyses. The descriptive statistical analysis results offered us a comprehensive understanding of the research subjects, ensuring the representativeness and breadth of the sample data.

Next, we conducted a reliability analysis, which included the calculation of Cronbach's alpha coefficient to assess the internal consistency of the various indicators in the questionnaire. Furthermore, through factor loading analysis, we further examined the explanatory power of the latent variables corresponding to each measurement item, ensuring the reliability and construct validity of the questionnaire items.

Subsequently, we performed a CFA to evaluate the structural validity of the questionnaire, including its convergent and discriminant validity. The convergent validity analysis ensured a strong correlation between each factor in the questionnaire and its corresponding measurement items. In contrast, the discriminant validity analysis ensured that the different factors were independent. These analytical results provided strong support for the validity of the questionnaire.

Finally, we utilized AMOS 26 software to construct an SEM and tested the proposed hypotheses through the model. The analysis of the SEM examined the direct relationships between variables and considered the relationships between latent variables, thereby providing a comprehensive framework for testing theoretical hypotheses. Through this complex statistical model, we were able to assess the overall fit of the theoretical model, as well as the impact and significance of each path.

All six of our theoretical hypotheses received empirical support following this series of empirical analyses. These results validate our research model's robustness and provide a reliable foundation for subsequent studies. Through these analyses, we gained a deeper understanding of the research phenomenon, offering valuable insights for academic research and practical applications in related fields.

Chapter 5: Discussion

In this chapter, we are delving into the empirical analysis results of our study and consider these findings within a broader research context. We aim not only to articulate these results but also to understand why they are as such. To this end, we first review the main findings of our study and compare them with previous research in related fields to identify and explain any consistencies or discrepancies. Through this comparison and dialogue, we hope to reveal the contributions of our study and provide a solid foundation for further academic inquiry and practical application.

5.1 Discussion of PE analysis results

In this study, we verify the impact of PE on doctors' intentions to use IH, including its potential benefits in enhancing work efficiency, speeding up task completion, and increasing income. Our results indicate that PE positively affects doctors' intention of IH, which is consistent with the findings of Yamin and Alyoubi (2020) in the use of telemedicine systems. Furthermore, research on mobile health applications has also confirmed the positive role of PE in doctors' engagement (P. Wu et al., 2022). Electronic health record systems are another example of how information technology can optimize medical processes. Studies on doctors' acceptance of health record systems have shown that PE positively affects using these systems (Shiferaw & Mehari, 2019). In research on healthcare professionals' intention to accept electronic medication management systems, researchers have indicated that PE is a decisive factor in their willingness to use such systems (Dabliz et al., 2021). This conclusion is also in line with the findings of our study.

The acceptance of emerging technologies often depends on whether they can benefit users significantly. In the field of precision medicine, the study by Tan et al. (2023) indicates that PE significantly influences people's choice of precision medicine. They suggest that people are more willing to accept a new disease management model if it can bring more benefits. Similarly, the degree to which electronic government, a product of digital transformation, is accepted is also affected by PE, as supported by the research of Hooda et al. (2022). In studies on older adults' intention to use wearable health devices, researchers have also found that PE significantly impacts their willingness to use these devices (Talukder et al., 2020). These

findings highlight the universal importance of PE in the innovation of service models driven by informatization.

As an emerging practice within the medical field, IH presents a degree of uncertainty for doctors during the adoption process. However, should this approach enhance the convenience of clinical procedures, alleviate doctors' workloads, increase efficiency, and enable the provision of assistance to a more significant number of patients within a limited timeframe, it is anticipated that doctors' intentions to utilize this innovation will be augmented. Therefore, doctors' positive expectations of improving work performance through IH are crucial in accepting this service.

However, while PE plays a significant role in accepting IH, we must recognize that it is just one factor driving its development. We cannot rely solely on enhancing doctors' PE to promote the growth of IH.

To further elaborate on the impact of PE, we can consider it from the perspective of a doctor's daily workflow:

1. IH can reduce the physical distance between doctors and patients by providing remote diagnosis and consultation services, making patient management more convenient for doctors.
2. Through IH, doctors can manage patient records and medical histories more efficiently, which not only improves work efficiency but also helps to reduce medical errors.
3. IH can offer doctors more flexible work schedules, improving the balance between work and life and positively affecting doctors' job satisfaction.

In summary, this study demonstrates that PE play a crucial role in driving doctors' intention to IH. By analyzing doctors' expectations for potential benefits such as improved work efficiency, faster task completion, and increased income, we found that PE significantly positively influence doctors' intention to IH. This result is consistent with other studies, emphasizing the general importance of PE in medical information services.

5.2 Discussion of EE analysis results

This study defines EE as the effort doctors require when learning and using IH, including time costs and the intention to learn. Our empirical results indicate that EE positively impacts doctors' intentions to use IH. This finding is consistent with the conclusions of Prakash and Das (2021) in their study on artificial intelligence clinical diagnostic support systems, where they found that EE could predict usage intentions. Similarly, Van Bussel et al. (2022), in their research on cancer patients' intentions to use artificial intelligence virtual assistants, and Yamin

and Alyoubi (2020), in their study on the use of telemedicine systems, also observed a positive impact of EE on behavioural intentions. Likewise, Abbad (2021) found that EE affects behavioural intentions when researching the willingness of students in developing countries to use electronic learning systems. Similarly, Al-Saedi et al. (2020) also found EE to be a significant positive influencing variable in their meta-analysis of factors affecting mobile payment behavioural intentions. When a technology makes it easier for users to operate, they are more likely to accept it.

However, we also note that some previous research findings are not entirely consistent with this study. For example, in studies investigating the willingness of older adults to use wearable medical devices, EE was not found to be a significant factor (Talukder et al., 2020). The result may be because user guidance and training for the product were very well implemented, reducing older adults' perception of technological difficulty. Furthermore, Schmitz et al. (2022) found in their study on telemedicine that the impact of EE on behavioural intentions was not significant due to the participants' lack of experience with the technology. The insignificance of EE might primarily be due to the surveyed subjects having no experience with telemedicine. With usage experience, it is easier to assess the ease of use of a technology. Hence, the analysis results may be insignificant.

These findings suggest that the quality of product services and user experience might moderate the impact of EE. Therefore, to more accurately understand how EE affects doctors' acceptance of IH, future research should consider the potential roles of these variables. Specifically, research should explore doctors' perceived difficulty in learning new systems, their ability to adapt to new technologies, and how these factors interact with EE to influence their intentions to use the systems.

To facilitate doctors' acceptance and use of IH, system developers need to focus on user experience, optimize the intuitiveness of interface design, simplify operational procedures, and ensure the accuracy of function descriptions. By implementing these measures, the difficulty of learning to use IH for doctors can be reduced, along with their perceived effort. Additionally, providing practical training and support services is crucial, as this will further lower the effort required by doctors and increase their intentions to use IH. Doctors are more likely to accept and continue using the service only when they find the new technology useful and valuable.

In summary, this study highlights the importance of system design in the innovation of medical service models and how improving user experience can enhance technology acceptance. Future research should further explore the constituent elements of EE and how these elements function across different user groups and technological contexts.

5.3 Discussion of SI analysis results

In this study, SI refers to the attitudes and perceptions of leaders, teachers, colleagues, family members, and friends surrounding the doctors regarding whether or not the doctors should use IH. Patients' attitudes are also an essential factor that cannot be overlooked, as their views on doctors using IH are also influential. The measurement items for SI encompassed the opinions of individuals whom the doctors consider essential, including the supportive stance of hospital management. Our empirical analysis shows that SI significantly affects doctors' intentions to use IH. This finding is consistent with that of Tan et al. (2023) in precision medicine, who noted that SI significantly affects people's choices. Similarly, Goyal et al. (2022) found that SI affects users' intentions to use online medical consultation platforms through perceived value. Likewise, Uymaz et al. (2023) observed the role of SI in their study on individuals' behavioural intentions to use artificial intelligence doctors.

This finding underscores the importance of the social environment in shaping individual behavioural intentions. People's acceptance and willingness to use are influenced by personal cognition and deeply affected by the experiences, views, and recommendations of those around them. Therefore, by creating a positive usage atmosphere, doctors can effectively promote the acceptance and use of IH. For example, if department leaders prioritize using IH as a critical initiative, doctors will be influenced by the management and more inclined to use them. Colleagues and teachers sharing positive experiences with IH and family and friends conveying information through social channels can all facilitate doctors' acceptance of this emerging service. Patients, as shapers of doctors' reputations and personal images, also influence doctors' intentions to use with their perceptions and attitudes towards IH. Strategic support and the direction of hospital development also significantly impact doctors' behaviour, with hospital policies and measures capable of significantly increasing doctors' intentions to use IH.

In summary, SI plays a significant role in doctors' decisions regarding using IH. To promote the widespread adoption of IH, stakeholders should consider how to encourage doctors to use this emerging mode of medical service through positive social influence. Improving the adoption of IH services may include providing additional educational resources, organizing seminars and training sessions, and enhancing patient awareness and acceptance of IH through patient education. Furthermore, hospital management can reinforce positive social influence by recognizing doctors who excel in using IH, thereby further increasing their intentions to use these services.

5.4 Discussion of the FC analysis results

In this study, FC is defined as the external circumstances and internal capabilities that can promote doctors' usage behaviour in IH, including the necessary resource conditions, essential knowledge and skills, and the availability of a service team providing necessary support. Specifically, FC involves whether doctors possess the infrastructure required for the operation of IH (such as smartphones, computers, and stable internet connections), the professional knowledge needed for operation, and the presence of a dedicated team to provide technical and service assistance. The research findings indicate that FC positively impacts doctors' actual use of IH. The observed trends in our study are consistent with the findings of P. Wu et al. (2022) investigated the use of mobile health applications, and the results reported by Ikhsan et al. (2021) regarding the adoption of mobile learning management systems. Additionally, the study by Larnyo et al. (2022) further confirms the significant role of facilitating conditions in patients with dementia using wearable devices.

These findings highlight the critical role of FC in promoting the acceptance and use of new technologies. Doctors are more likely to actively use IH if they have the necessary resources and knowledge and are supported by professional technical and customer service teams. Therefore, to enhance doctors' intentions and frequency of using IH, stakeholders should ensure that doctors can easily access the required technological resources, provide comprehensive operational training, and establish a responsive and experienced technical support and customer service team. These measures will help doctors use the functions of IH more effectively, improving the efficiency and quality of medical services. However, they will also enhance doctors' trust and satisfaction with the IH, promoting long-term technology acceptance and use.

In summary, FC is a crucial factor affecting doctors' use of IH. Doctors will be more willing and able to use IH effectively only when they have the necessary resources and knowledge and are supported by professional technical and customer service teams. The potential improvements in the quality of medical services and a more convenient and efficient working environment for doctors are significant benefits of these technological advancements.

5.5 Discussion of Empathy analysis results

In this study, Empathy refers to the medical staff's understanding of patients' needs when using IH. Empathy is measured by whether doctors can consider others' perspectives, view and think about issues from someone else's point of view, treat others kindly, feel distressed and help

others in difficulty. Through these measurements, we have concluded that Empathy positively impacts doctors' intentions to use IH.

The findings of this study are consistent with those of T. Y. Huang (2022) regarding the acceptance and use of service robots by older adults in hotels. They also align with the results of Malik et al. (2020) concerning how empathy promotes individuals' use of chatbots. The findings suggest that empathy plays a universal role in facilitating the acceptance of technology, whether in the medical field or the service industry.

This research takes an innovative approach by studying empathy within the context of emerging technology applications, and a field researcher still needs to investigate thoroughly. Moreover, empathy, as a facilitator of prosocial attributes, aligns well with the background of this study. We hope doctors will fulfil their professional duties and possess a high moral standard, such as being willing to save lives and provide compassionate care. This study identified Empathy as a significant factor influencing doctors' intentions to use IH, underscoring its importance.

The core purpose of IH is to enable doctors to provide more convenient medical services to patients. The significant consideration for incorporating Empathy into this study stems from the findings of Y. J. Wang et al. (2022), which revealed that doctors' empathic skills can significantly improve the doctor-patient relationship. Additionally, research by X. Zhang et al. (2023) found that a doctor's Empathy affects doctor-patient communication and patient treatment outcomes.

The findings of this study are consistent with the limited existing research on the impact of empathy on the willingness to use emerging technologies and illustrate the innovative introduction of the concept of empathy, expanding the explanatory power of the UTAUT model for the acceptance of IH. In the practice of IH, China's IH currently utilize doctors' fragmented spare time to provide diagnostic and treatment services. This requirement implies that doctors must dedicate their time and effort to comprehending the needs of their patients. If doctors can feel the convenience that IH bring to patients and truly understand their needs, they will be motivated to use IH.

During the medical process, patients require the professional assistance of doctors due to their illnesses. In the doctor-patient relationship, patients are relatively vulnerable or unfortunate and need more care and help from doctors. If doctors possess a strong sense of empathy, they can understand the misfortunes of patients and hold a sympathetic attitude towards the adversities they face. They will also be willing to invest their own time and effort to assist patients. When patients experience difficulty in mobility and find it challenging to

travel to and from the hospital, empathetic doctors can sense the inconvenience patients face. Therefore, they might proactively recommend using IH to patients, allowing them to access medical services conveniently and reducing the distress associated with travelling to the hospital.

Furthermore, empathy may enhance patient compliance with treatment. Patients are likely to be more willing to follow a doctor's recommendations when they feel that the doctor understands their situation and needs. This compliance can improve treatment outcomes and increase patient safety by reducing misdiagnoses and treatment errors.

In summary, empathy is not only a reflection of a doctor's professional ethics but also a key factor influencing their intentions to use IH. The stronger a doctor's empathy is, the better they can understand and meet patients' needs, making them more likely to adopt this emerging medical service. Therefore, enhancing the level of empathy among doctors can improve the doctor-patient relationship and promote the development and widespread adoption of IH.

5.6 Discussion of the BI analysis results

In this study, we elucidated the behavioural intention of doctors to use IH, precisely the degree to which doctors intend to engage with IH. Through empirical analysis, we not only confirmed that the behavioural intention to use has a positive influence on actual use behaviour but also further established the behavioural intention to use as a critical predictor of use behaviour. These outcomes are in line with the findings of Bai and Guo (2022) regarding the behavioural intention to use digital health information systems and are also consistent with the research on telemedicine acceptance conducted by Ong et al. (2022) in the Philippines, as well as the study on the acceptance of mobile health services in developing countries by Alam et al. (2020), all of which underscore a significant positive correlation between the behavioural intention to use and actual use behaviour.

These findings further illustrate that the behaviour intention to use is not only a vital predictive factor for usage behaviour but also plays a central role in promoting the acceptance and use of technology. The behavioural intention of doctors to use IH evolves from an initial understanding of the concept to recognizing its potential value and then forming specific plans to use it. This coherent psychological process reflects a gradual shift in cognition and attitude. During this process, as doctors' awareness of IH increases and they conduct a more thorough assessment of its potential benefits, their intention to use the service is enhanced.

Moreover, our study also found that various factors, including PE, EE, SI, and Empathy,

influence doctors' behavioural intention to use IH. For instance, if doctors believe that IH can improve work efficiency, enhance the quality of patient care, or increase job satisfaction, their behavioural intention to use it will be strengthened. SI, such as the attitudes of colleagues and the expectations of patients, may also affect doctors' behavioural intention to use. Additionally, technological factors, such as the system's reliability, the user-friendliness of the interface, and the availability of technical support, influence the behavioural intention to use.

To promote the use of IH among doctors, stakeholders should consider these factors and take measures to enhance their behavioural intention to use. Enhancing doctors' behavioural intention to use the service may include providing better technical training, improving the system's user-friendliness, and reinforcing the service implementation through proactive communication strategies. Doctors' acceptance of IH can be increased through such efforts, encouraging widespread adoption.

In summary, doctors' intentions to use IH are complex psychological constructs influenced by individual, social, and technological factors. By understanding how these factors affect doctors' intentions to use IH, we can design and implement strategies more effectively to promote its acceptance and use, ultimately improving the quality and efficiency of healthcare services.

Chapter 6: Conclusion and Outlook

This chapter summarizes the study's main findings and discusses their theoretical and practical implications. It also identifies the limitations encountered during the research process and proposes potential directions for future research based on these limitations. By addressing these key aspects, this chapter aims to provide a comprehensive reference for the continuous development and optimization of IH. Additionally, it outlines the research questions that guided this study, offering insights into the specific areas of inquiry explored. These discussions will serve to guide subsequent researchers in their exploratory endeavors and contribute to the broader understanding of IH acceptance and use.

6.1 Main conclusions of the study

This study aimed to analyze the key driving factors behind doctors' intention to use IH in Guangdong Province. In the context of China's current digital transformation, doctors' willingness to accept is crucial for the success of this emerging service model. The attitudes and behaviors of doctors not only affect the quality and efficiency of medical services but also serve as the core driving force for innovation in the healthcare industry. Innovatively, this research incorporated empathy as a supplementary variable into the UTAUT model to enhance the model's explanatory power regarding doctors' willingness and behavior in using IH. This choice was based on an understanding of the importance of comprehension and trust in doctor-patient relationships and an in-depth study of the literature on empathy. Empathy not only facilitated a deeper understanding of patient needs among doctors but also strengthened their intrinsic motivation to provide high-quality medical services.

Using a questionnaire survey method, this study collected 359 valid responses and employed SEM for empirical analysis.

Based on the research questions, the empirical results are as follows:

1. Performance Expectancy, Effort Expectancy, and Social Influence in the UTAUT model positively influenced doctors' intentions to use IH. Doctors believed that using IH could significantly improve work efficiency and service quality, which strongly drove their intention to use. When doctors perceived that the technology of IH was simple and easy to master, their

intention to use was significantly enhanced. Positive acceptance attitudes within their peer and social environments also had a significant positive impact on their intention to use IH.

2. Behavioral Intention and Facilitating Conditions in the UTAUT model positively influenced doctors' actual use behavior. Doctors' intention to use directly affected their actual usage behaviors. Additionally, the availability of resources and technical support, among other facilitating conditions, also positively influenced doctors' actual usage behaviors.

3. The newly added variable, Empathy, positively influenced doctors' intention to use IH. The study showed that the higher the level of empathy among doctors, the stronger their intention to use IH. This suggests that enhancing doctors' empathy can effectively increase their acceptance of new technologies.

This research confirmed the effectiveness of the UTAUT model, expanded with empathy, in the study of technology acceptance during the digital transformation of medical services. By introducing empathy as a new variable, it provided a new perspective on understanding doctors' acceptance of IH. Based on the empirical analysis, targeted intervention measures were designed, including enhancing doctors' Performance Expectations, optimizing their Effort Expectations, strengthening the positive effects of Social Influence, enhancing Facilitating Conditions, cultivating doctors' Empathy, and striving to convert intention to use into actual usage behavior. These findings and management suggestions provide important references for IH managers in advancing the development of IH and offer practical strategies for the promotion and development of IH, particularly in enhancing doctors' intention and behavior towards usage.

6.2 Theoretical contributions of the study

This study conducts an in-depth exploration of the emerging IH, a transformative medical service model in China. It innovatively integrates Empathy with the foundation of technology acceptance theory, significantly extending the UTAUT. This research's theoretical contributions primarily reflect the following three aspects:

Firstly, this study significantly expands the research perspective on IH. Previous research has mainly focused on patients' intentions to accept IH, with less attention given to doctors' perspectives. Considering the critical role of doctors in the doctor-patient relationship, this study emphasizes the importance of doctors' acceptance for the successful implementation of IH. By shifting the focus to doctors, this study provides new theoretical insights for understanding and promoting the use of IH.

Secondly, this study innovatively expands the critical factors of the UTAUT model by integrating Empathy. Doctors' roles extend beyond mere technology users to service providers within the specific medical service platform of IH. Introducing Empathy allows the model to comprehensively consider doctors' psychological factors, offering a more detailed and profound understanding of the factors influencing their acceptance and intentions to use IH. Empirical research results support the significant role of Empathy in predicting and explaining doctors' usage behaviour in IH.

Lastly, this study provides a new theoretical perspective and methodological tools for transforming technology-driven healthcare service models. The research findings have practical implications for IH managers and policymakers. By gaining a deeper understanding of doctors' psychological motivations and behavioural intentions, healthcare institutions can design and implement strategies more effectively to promote the acceptance and use of IH.

In summary, this study not only makes a theoretical contribution to the field of IH by broadening the research horizon and enriching the theoretical model, but it also provides new ideas and strategies for practice, with significant guidance value for management practices and policy formulation. Through these theoretical and practical contributions, the study aids in advancing the development of IH, enhancing the quality of healthcare services, and ultimately benefiting a wide range of patients and the medical industry.

6.3 Management recommendations for IH

IH has been continuously exploring its application potential in the healthcare industry since its inception in 2016 as an innovative medical service model that integrates internet and information technologies. The COVID-19 pandemic in 2020 mainly propelled the rapid development and comprehensive implementation of this model. In the face of this global health crisis, IH, with its convenient and contactless service offerings, has successfully met the urgent needs of patients, especially excelling in online diagnostics and medication prescription renewals. However, as the pandemic has subsided, the growth of IH has encountered new challenges, such as insufficient doctor participation and a decrease in online medical consultation activities. These issues have accentuated the need for a thorough investigation and resolution of the critical drivers for doctor involvement in IH. Through a comprehensive literature review and the construction of theoretical models, this study aims to explain the factors influencing doctors' adoption of IH by employing an Empathy-expanded UTAUT model. We have formulated potent management recommendations through empirical analysis of these

factors. These recommendations deepen the understanding of doctors' behaviour towards adopting Internet medical practices and have significant practical implications for guiding the management of IH and enhancing the quality and efficiency of service delivery.

6.3.1 Enhancing doctors' PE

Enhancing doctors' performance expectancy regarding their participation in this service model is crucial to fully leveraging IH's potential. This expectancy is not only related to the doctors' personal work efficiency and patient satisfaction but is also a central driving force behind IH's success.

This study defines PE as doctors' belief that using IH can enhance work efficiency and patient satisfaction. Through empirical analysis, we have found that PE significantly impacts doctors' attitudes and behaviours towards using IH. Doctors anticipate that IH will bring convenience to their work, for instance, through streamlined processes and more efficient information management, thereby increasing work efficiency.

To achieve this objective, hospital administrators should thoroughly contemplate the development models of IH during construction, ensuring they offer genuine convenience for doctors' daily work. This requirement implies that doctors should be able to access patient information easily through IH. However, it also includes the seamless integration of medical information systems, allowing doctors to efficiently obtain and process patient information, whether in a physical hospital or through the platform of IH.

Furthermore, with the innovation and proliferation of intelligent medical devices, such as smart blood pressure monitors and smart glucometers, the functionality of IH will be further enriched and expanded. These devices provide patients with more convenient and accurate self-monitoring tools and offer doctors real-time and precise data support, further enhancing medical diagnosis and treatment efficiency and quality. This technological advancement elevates the overall level of healthcare services and allows doctors to more tangibly perceive the practical benefits of IH in their daily work.

Lastly, the accessibility of IH makes them an ideal tool for patient follow-up. For patients who require regular follow-ups, IH offers a more convenient and faster way to do so without the need to travel back and forth to the hospital, saving a significant amount of time and energy. For doctors, this method reduces their workload and improves the efficiency and quality of follow-ups. Therefore, when designing IH, hospitals should fully leverage their convenience to allow doctors and patients to experience the unique advantages of IH.

Through these comprehensive measures, we can effectively enhance doctors' PE of IH, thereby stimulating their intentions to use and participate in the IH. The innovative medical service model, mainly propelled by the COVID-19 pandemic in 2020, has rapidly developed and been widely implemented. This development has helped improve the quality and efficiency of medical services and ensured the sustainable growth of IH, providing strong support for the digital transformation of the healthcare industry.

6.3.2 Optimizing doctors' EE

Optimizing doctors' EE is crucial in the construction and development of IH. EE refers to the anticipated effort doctors believe they must exert to use a new system. To reduce the perceived difficulty of these expectations, we must address the following aspects:

Firstly, during the construction of the IH, it is essential to design a user-friendly interface to ensure that doctors can easily use it. The interface should be simple and intuitive, with commonly used functions quickly accessible, and the operational procedures should be as direct as possible. By adopting the best user experience design principles, we can ensure that doctors can minimize unnecessary learning curves when using the IH.

Secondly, customized training programs are crucial for enhancing doctors' EE. We should provide comprehensive training, including online tutorials, workshops, and one-on-one coaching, to help doctors become familiar with the various functions of the IH. The training content should be personalized according to the doctors' areas of specialization and technical proficiency to ensure that each doctor receives the support they need.

Thirdly, we need to establish a responsive technical support team so doctors can receive timely assistance whenever they encounter technical issues. Additionally, regular system maintenance and updates can ensure the platform's stability, reducing the technical obstacles doctors may face during its use. In order to continuously optimize the IH, we should encourage doctors to provide feedback and establish a mechanism for regularly assessing and implementing this feedback. Such open communication channels will help us identify and resolve issues and make doctors feel they have a tangible impact on improving the IH.

Finally, we can reduce doctors' difficulty using the IH by implementing incentive measures. These measures include recognizing doctors who use the IH and providing rewards. Through these incentives, we can increase doctors' enthusiasm to use the IH and enhance their satisfaction and loyalty.

By implementing the measures above, we can significantly lower the difficulty for doctors using the IH, raise their EE, and ensure that the IH can realize its full potential in healthcare services.

6.3.3 Enhancing the positive effects of SI

We need to adopt a series of strategies to mobilize society's and organizations' power to enhance the positive effects of SI and promote the adoption of IH.

Firstly, hospital leaders should demonstrate their support for IH through their actions. They can inspire their medical teams by sharing personal experiences of using the IH in public settings and explaining how it can improve the quality of healthcare services.

Furthermore, encouraging communication and sharing among doctors is essential for establishing a positive social influence. By organizing regular internal seminars, doctors can share their experiences using the IH, discuss challenges encountered and solutions, and build trust and recognition among their peers.

Positive feedback from patients is another powerful source of SI. Hospitals should establish mechanisms to collect and display positive patient testimonials regarding IH. These reviews can motivate doctors to adopt new technologies.

The shaping of organizational culture must be considered. Hospitals should foster an atmosphere of innovation and openness to new things, encouraging more doctors to participate by recognizing proactive ones in adopting new technologies.

Lastly, the strategic use of professional advocacy groups, social media, and online platforms significantly boosts social influence. We can use the resources and influence of these platforms to promote the advantages and achievements of IH, thereby attracting more attention and interest from doctors.

By implementing these strategies, we can effectively enhance SI's positive impact, promote doctors' adoption of IH, and thus improve the efficiency and quality of the entire healthcare system.

6.3.4 Enhancing the role of FC

Hospitals should provide multilevel support to enhance FC and ensure doctors can fully utilize IH.

Firstly, hospitals must invest in high-quality infrastructure, including fast internet connections and advanced computing equipment, to ensure doctors can seamlessly deliver internet hospital services.

Secondly, providing comprehensive technical training is crucial. Doctors should receive regular training to maintain proficiency in using IH and stay updated with the latest releases. Additionally, establishing a readily available technical support team can assist doctors in resolving any technical issues encountered during use.

Administrative and legal support are also indispensable. Hospitals should provide clear guidance to doctors, including how to conduct online consultations legally, comply with regulations, and ensure the security and privacy of patient information.

Lastly, hospitals should encourage doctors to participate in the research and feedback process for IH. We can continuously improve and optimize IH's services through regular data analysis and user feedback.

6.3.5 Cultivating doctors' empathy

According to our empirical analysis, a doctor's empathy significantly influences their intentions to use IH. To enhance the quality-of-service doctors provide on this emerging IH, we propose the following strategies:

Firstly, because text, voice, or video primarily facilitate communication in IH, this convenience might lessen the depth of emotional exchange. Consequently, we need to develop specialized training programs for IH that teach doctors how to build trust and understanding effectively in remote communications and make up for the limitations of non-face-to-face interactions.

Secondly, Empathy among doctors can be fostered by regularly organizing online patient story meetings, allowing doctors to hear about the patients' experiences directly. Such interactions can help doctors better understand the emotions and needs of patients, thereby exhibiting more empathy in their IH services. Further, encouraging multidisciplinary team collaboration through exchanging knowledge across specialties can give doctors a more comprehensive perspective on understanding and meeting patient needs.

By implementing these measures, we believe doctors' empathy can be effectively enhanced. In turn, it will increase their intentions to use IH, ultimately improving patient satisfaction and the quality of medical services.

6.3.6 Converting intentions to use into actual use behaviour

To convert doctors' intentions to use IH into actual use behaviour, we endorse the following management suggestions:

Firstly, implementing incentive measures can help doctors transform their intentions to use IH into actual usage behaviour. These measures include financial rewards, career development opportunities, and public recognition to reward those doctors who actively adopt and promote the IH.

Secondly, simplifying the operational procedures of IH can reduce the administrative and technical burdens on doctors during use, making it more convenient and efficient. At the same time, establishing a round-the-clock technical support team ensures that doctors can receive timely assistance when using IH, enhancing their confidence.

Additionally, regularly holding training sessions and workshops is a vital management suggestion. Understanding the functions of IH and learning how to use these tools effectively can help doctors improve work efficiency and patient satisfaction.

Through internal communication and training, foster a positive culture within the hospital that encourages doctors to embrace and utilize new technologies to enhance medical services. Regularly monitor doctors' usage behaviour and adjust incentive and support strategies based on the assessment results to ensure that our measures effectively stimulate the doctors' enthusiasm for use.

Doctors' intentions to use the system will be effectively transformed through these comprehensive measures, and IH's utilization rate and service quality will be significantly improved.

6.4 Limitations of the study

This study aims to employ an Empathy-expanded UTAUT model to elucidate the factors influencing doctors' acceptance of IH in Guangdong Province. Although we have constructed the theoretical framework for our research based on existing literature and collected data through a cross-sectional study design, the study's limitations still need to be recognized and acknowledged.

Firstly, although the cross-sectional design employed in this study can reveal the situation at a specific time, it cannot capture the evolution of doctors' behaviour in using IH over time. As IH develops rapidly, new influencing factors may emerge that the current study still needs

to consider. Therefore, future research should adopt a longitudinal design to track and understand these changes.

Secondly, this study employed a convenience sampling method and the sample was limited to doctors in Guangdong Province. Although Guangdong holds a significant position in terms of medical resources and service levels in China, the specific economic and social environment of the province may mean that the research findings are not entirely applicable to doctors in other regions of China. Moreover, convenience sampling may lead to sample selection bias, as the selection of participants is based on ease of access and willingness to participate, rather than random sampling. This could limit the representativeness and generalizability of the study results. To enhance the universality of the findings and reduce sample bias, future research should consider using more systematic random sampling methods and expanding the scope of the study to other provinces in China. This would not only cover different economic and medical environments but also increase the diversity and depth of the research, further validating and refining the technology acceptance model for IH.

Moreover, this study primarily used a questionnaire survey for data collection, which may be subject to participant subjectivity and recall bias. Future research could incorporate qualitative research methods, such as interviews or case studies, to delve deeper into doctors' perceptions and experiences with IH and gain a more comprehensive understanding.

Additionally, this study focused on individual factors influencing doctors' intentions to use IH, potentially overlooking the impact of external environmental factors, such as laws, policies, and medical insurance payments, on their acceptance. Future research should consider these factors to construct a more comprehensive framework of understanding.

In summary, although this study offers a preliminary understanding of the factors influencing doctors' acceptance of IH in Guangdong Province, the limitations above should be considered when interpreting the research findings. We look forward to future studies that can further deepen and expand upon this foundation to promote the development and application of IH in China.

6.5 Future outlook

This research conducts an empirical study from a doctor's perspective, utilizing an Empathy-expanded UTAUT model. Although this study has provided some insights into doctors' intentions to use IH, given that IH is still in a developmental phase, the scope of this research is limited. Future studies will need to improve and deepen the research content continuously.

Firstly, future research could expand the scope of sample collection to include doctors from different regions and various levels of hospitals. Considering the differences in economic development and social culture among regions within Guangdong Province, future studies could explore the factors influencing doctors' intentions to use IH in different contexts through comparative analysis. Incorporating qualitative research methods would help reveal more detailed regional and cultural differences that affect doctors' intentions to use these services.

Secondly, since this study employed a cross-sectional research design, future research could adopt a longitudinal design to track changes in doctors' intentions to use IH over time. Longitudinal data would allow for a more in-depth analysis of the factors influencing doctors' use of IH and their dynamic changes over time, thus providing a more accurate basis for developing targeted strategies and interventions.

Thirdly, this study expanded the UTAUT model by including Empathy, but as IH represent a new healthcare service model, their influencing factors are multidimensional and multilevel. Future research could consider additional influencing factors, such as medical insurance policies, legal regulations, patient satisfaction, service quality, and data security, to more comprehensively analyze doctors' decision-making process and influencing factors using IH. Additionally, researchers could explore individual-level factors such as doctors' traits, career development, and job satisfaction to understand how they influence their acceptance of IH.

In summary, future research should build upon the foundation of this study, continuously exploring and refining it to provide more profound and comprehensive theoretical support and practical guidance for the development of IH. Through these studies, we can better understand and promote doctors' acceptance and use of IH, thereby enhancing its role in improving the efficiency and quality of healthcare services.

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Annex A: The Medical Ethics Committee Statement

The Medical Ethics Committee Statement

Reference number: II2023-205-02

Title	Acceptance of Internet Hospitals among doctors in Guangdong Province: An Exploration based on the Extended UTAUT Model
investigator	Chenxi Zu
Comment:	According to Ethical Guidelines for Biomedical Research Involving Human Subjects by the National Health Commission, the Good Clinical Practice by National Medical Products Administration and several Chinese ethical guidelines, the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subject, International Ethical Guidelines for Biomedical Research Involving Human Subjects by the CIOMS, ICH-GCP, the informed consent form and case report have been reviewed by the ethical committee. Comment is as follow: Approved.
Committee Chairman:	彭亮
Date: 6 th Sept, 2023	
Medical Ethics Committee of the Third Affiliated Hospital of Sun Yat-sen University	



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Annex B: Informed Consent Form (English)

Informed Consent Form

Dear Participant,

We invite you to participate in our study, and we sincerely appreciate your cooperation and support. Before you decide whether or not to participate, please take a few minutes to carefully read the following information, so that you can have a comprehensive understanding of the study's purpose, procedures, and risks.

Title of the Study:

Title: Acceptance of Internet Hospitals among doctors in Guangdong Province: An Exploration based on the Extended UTAUT Model

Research Purpose:

Based on existing theories and research, this study will use the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Empathy Survey Questionnaire to conduct empirical analysis and verification. We aim to conduct an in-depth analysis of the factors influencing and the mechanism of action in the acceptance of Internet hospitals by doctors. Based on the analysis results, we will propose recommendations for the sustainable development of Internet hospitals.

Research Procedure:

This study will adopt a stratified random sampling method to select doctors as participants. Participants will be kindly asked to voluntarily complete the questionnaire after providing informed consent. The questionnaire is expected to take approximately 5 minutes to complete.

Risk Assessment:

The survey will be conducted anonymously, and your identity will be kept confidential. You do not have to worry about the disclosure of your personal information. The purpose of this survey is to explore the acceptance and use of internet hospitals from the perspectives of technology acceptance and empathy, and does not involve sensitive, painful, or uncomfortable topics.

Confidentiality:

This survey will be conducted anonymously, and your identity will be kept confidential.

The data you provide will only be used for this research. We will strictly adhere to relevant national laws, regulations, and ethical standards in the use of data to ensure data security. Your personal identity information will not appear in any publicly published content, and your privacy will not be compromised. The data you provide will be retained for five years. Only aggregated statistical information will be kept for this study.

Participant Rights:

You have the right to terminate your participation in the study at any time, and you can refuse to answer any questions you do not wish to answer. We will strictly abide by relevant laws and regulations to protect your rights and privacy. After the completion of this study, you have the right to request the results of the survey from the research team.

Consent to participate:

I have carefully read the above information and understand the purpose, procedure, and potential risks of the study. I know that I have the right to choose whether to participate in the study and can terminate my participation at any time. If I decide to participate in the study, I am willing to cooperate and provide information and data in accordance with the study requirements.

If you have any questions or need further information, please do not hesitate to contact me. Thank you for your support and cooperation.

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Supervisor: Professor Cruz

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Annex C: Informed Consent Form (Chinese)

知情同意书

尊敬的参与者：

我们邀请您参加我们的研究，我们也非常感谢您的配合和支持。在您决定是否参加之前，请花几分钟时间仔细阅读以下信息，以便全面了解研究目的、程序和风险等方面的内容。

研究题目：

探索广东省医生对互联网医院接受程度的影响因素：基于扩展UTAUT模型的解释

研究目的：

本研究将在现有理论和研究的基础上，利用整合技术接受模型（The Unified Theory of Acceptance and Use of Technology, UTAUT）和同理心调研问卷，开展实证分析和验证。深入分析医生对于互联网医院接受的影响因素和作用机制。基于分析结果，提出互联网医院健康、可持续发展的建议。

研究程序：

本研究将采取分层随机抽样的方式选取医生作为被调查者，被调查者需要在知情同意的基础上，自愿完成问卷内容的填写。本次问卷内容填写需要约5分钟时间。

风险评估：

本次问卷采用匿名调查方式进行，您的身份将得以保密，您不必担心您的个人信息泄露。本次调查问卷旨在从技术接受和同理心的视角探讨互联网医院的接受和使用情况，不涉及敏感主题、痛苦或不适的主题。

保密性：

本次调查采用匿名方式进行，您的身份将得以保密，您所填写的数据将仅被用于本研究。我们将严格遵守国家相关法律法规和伦理规范使用数据，保障数据安全，您的个人身份信息不会出现在任何公开发表的内容中，您的隐私不会被泄露。您所填写的数据将被保留五年。本研究将仅保留汇总后的统计资料。

参与者权利：

您有权利在任何时候终止参与研究，也可以拒绝回答任何您不愿意回答的问题。我们会严格遵守相关法律法规，保护您的权利和隐私。在本研究结束后，您有权利向研究团队获取问卷调查的结果。

同意参与：

我已仔细阅读以上信息，并且理解了研究的目的、程序和可能存在的风险等方面的内容。我知道我有权选择是否参加研究，而且我可以在任何时候终止参与研究。如果我决定参加研究，我愿意配合并按照研究要求提供信息和数据。

如果您对以上信息有任何疑问或需要进一步了解，可以随时与我联系。感谢您的支持和配合。

研究人员的联系方式：

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导师：Professor Cruz

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Annex D: Questionnaire (English)

Dear Doctor,

Thank you for taking the time to participate in our survey. This survey should take approximately 5 minutes to complete. Your participation is crucial to our research and we appreciate your valuable time and opinions.

1. Gender:

☐ Male ☐ Female

2. Age:

☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 51 and above

3. Education level:

☐ College ☐ Bachelor's degree ☐ Master's degree

☐ Doctorate

4. Work experience:

☐ Less than one year ☐ 1-5 years ☐ 6-10 years ☐ 11-15 years

☐ 16-20 years ☐ Over 20 years

5. Professional title:

☐ Resident Doctor ☐ Attending Doctor

☐ Associate Chief Doctor ☐ Chief Doctor

6. I find IH very useful in my work.

☐ Strongly disagree ☐ disagree ☐ neutral

☐ agree ☐ strongly agree.

7. Using IH enables me to complete work tasks more quickly.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

8. Using IH improves my work efficiency.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

9. Using IH increases my income.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

10. My interaction with the IH would be clear and understandable.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

11. It would be easy for me to become skillful at using the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

12. I would find the IH easy to use.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

13. Learning to operate the IH is easy for me.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

14. People who influence my behaviour think that I should use the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

15. People who are important to me think that I should use the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

16. The senior management of this business has been helpful in the use of the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

17. In general, the organization has supported the use of the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

18. I have the resources necessary to use the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

19. I have the knowledge necessary to use the IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

20. The system is not compatible with other system I use.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

21. A specific person (or group) is available for assistance with IH difficulties.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

22. I intend to use the IH in the next 3 months.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

23. I predict I would use the IH in the next 3 months.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

24. I plan to use the IH in the next 3 months.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

25. I never use IH.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

26. I use IH a few times per month.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

27. I use IH a few times per week.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

28. I use IH a few times per day.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

29. Sometimes I find it difficult to take the perspective of others.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

30. To better understand others, I sometimes try to imagine myself in their place.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

31. When I am upset with someone, I usually try to put myself in his or her shoes.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

32. Before criticizing someone, I try to imagine how I would feel if I were in his or her position.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

33. I often think about being kind to and caring for people who are less fortunate than me.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

34. Sometimes I do not feel very sad when others are going through a hard time.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

35. When I see others being taken advantage of, I feel the need to protect them.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

36. Other people's misfortunes usually do not bother me very much.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

37. Sometimes when I see others being treated unfairly, I do not feel very sympathetic toward them.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

38. I am often moved by what happens around me.

☐ Strongly disagree ☐ disagree ☐ neutral ☐ agree ☐ strongly agree.

Thank you for your participation in this Questionnaire

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Annex E: Questionnaire (Chinese)

尊敬的医生朋友：

感谢您抽出时间参与我们的问卷调查。此问卷大约需要5分钟完成，您的参与对我们的研究至关重要，我们将不胜感激您的宝贵时间和意见。

1. 性别

☐ 男性 ☐ 女性 ☐

2. 年龄

☐ 21-30岁 ☐ 31-40岁 ☐ 41-50岁 ☐ 51岁及以上

3. 教育程度

☐ 大专 ☐ 大学本科 ☐ 硕士 ☐ 博士

4. 工作年限

☐ 1年以下 ☐ 1-5年 ☐ 6-10年 ☐ 11-15年

☐ 15-20年 ☐ 20年以上

5. 您所具备的职称

☐ 住院医师 ☐ 主治医师 ☐ 副主任医师 ☐ 主任医师

6. 我发现互联网医院在我的工作中非常有用

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

7. 使用互联网医院可以令我更迅速的完成工作任务

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

8. 使用互联网医院可以提高我的工作效率

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

9. 使用互联网医院会提高我的收入

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

10. 互联网医院的操作界面清晰易懂

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

11. 我可以很轻松地熟练使用互联网医院系统

☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

12. 我发现互联网医院的操作很便捷
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
13. 学习互联网医院的操作很容易
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
14. 能够对我行为产生影响的人认为我应该使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
15. 对我来说很重要的人认为我应该使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
16. 医院管理人员为使用互联网医院提供了必要的帮助
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
17. 总体来说，医院支持使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
18. 我具备使用互联网医院所需要的资源（手机、电脑、网络等）
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
19. 我具备使用互联网医院所需的知识
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
20. 互联网医院与我使用的其他医疗系统不能兼容
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
21. 有指定的人员（或团队）可提供互联网医院系统使用方面的帮助
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
22. 我打算在未来三个月内使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
23. 我预测我将会在未来三个月内使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
24. 我计划在未来三个月内使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
25. 我从来不使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
26. 我每月会使用几次使用互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意

27. 我每周会使用几次互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
28. 我每天会使用几次互联网医院
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
29. 有时候, 我比较难做到设身处地为他人着想
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
30. 为了更好地理解别人, 有时我会试图从他们的角度看事情
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
31. 当我对别人不满时, 我通常会试着站在他们的角度思考一下
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
32. 在批评别人之前, 我试图想想如果我站在他的位置, 感觉会是怎样
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
33. 我经常想去善待并关心那些比我不幸的人
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
34. 有时候, 当别人有困难时, 我并不会感到难过
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
35. 当看到别人被利用, 我会想去保护他们
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
36. 别人的不幸通常不会很打扰我
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
37. 看到别人受到不同等对待, 我有时并不很同情他们
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意
38. 我常常被身边发生的事情感动
☐ 非常不同意 ☐ 不同意 ☐ 不清楚 ☐ 同意 ☐ 非常同意