

Qualitative Exploratory Study on Digital Healthcare in Chengdu, China

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Abstract: In the last 20 years, China has experienced an epic digital transition that has fundamentally altered many sectors, and healthcare is one of those that has been changed the most drastically. Since the nation has been adopting state-of-the-art technology, including telemedicine, mobile health apps, and AI-based diagnostic aids, healthcare has taken a new turn. The technologies are not just a fad because they are critical to bettering the provision of healthcare, access, and streamlining of healthcare services, particularly in underprivileged regions. The implementation of digitally-based health technologies has immensely transformed Chinese healthcare provision to rely less on in-person consultation, and instead resort to more distant healthcare options that are available to more people.

Keywords: Chengdu; Digital healthcare; Qualitative exploration

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1. Digitalization of healthcare

This digital transformation in healthcare has made the industry highly competitive, where both home-grown and global giants have become key players. Healthcare players like Alibaba Health, Tencent Healthcare, and Ping An Good Doctor have established themselves as the major participants in the direction of digital healthcare in China, working with traditional players as well as governmental projects to improve the health of the people with the help of technology^[1-2]. These players have also driven the fast rate of innovation and have ensured that digital health services form the backbone of the healthcare sector in China, especially among the rural citizens who have been grappling with challenges in healthcare access.

A rapid increase in the population that seeks such digital healthcare services has been caused by the imminent penetration of the smartphone and internet market, as well as a rapidly aging Chinese population^[3]. The presented demand has augmented the rivalry between the telemedicine platforms, mobile health services, and AI diagnostics. The new issue for digital health care providers is to attract new users and, at the same time, maintain current users. It is much more expensive to get new users than to retain them, and that is why customer loyalty should be built,

and the quality of services provided.

Customer satisfaction has also become one of the vital elements of the sustainable development of digital healthcare services. People in the health sector have learned over the years that satisfaction among the patients goes beyond the quality of medical care, but also the satisfaction they get from digital platforms. Good user experience, increased retention rates, boosted involvement, and better performance of the business. Therefore, streamlining user experiences, bettering enterprise data protection, and improving digital user experience have been crucial towards winning customer trust and loyalty ^[4].

Although the development of digital health platforms has been rather striking, there are still a range of obstacles on the way to the ultimate inclusion of such technologies into the context of the Chinese healthcare systems ^[5]. Various barriers, such as issues surrounding data privacy, cybersecurity threats, and regulation, are some of the key challenges that hinder the large-scale adoption of digital medicine. Moreover, urban environments have quickly adopted the digital healthcare practice, whereas rural areas continue to have serious challenges, such as the lack of internet, digital literacy, and infrastructure to accommodate modern healthcare technologies.

The proposed study will center on Chengdu, the capital city of Sichuan Province, as this location is a key point in the development of digital health in the current scenario in China. Chengdu has also become one of the Chinese cities taking the lead in digital healthcare innovation by becoming a role model in the implementation of telemedicine, the utilization of AI in diagnosing diseases, and smartphones to improve health management ^[6]. The fast urbanization of the city, expansion of the technological base, and the strategic position of the city in Western China have made it a better fit for researching the application of digital health technologies in the real world.

The few existing studies on the topic of digital health and its transformation found a breakthrough due to the uniqueness of Chengdu, which is positioned both as an opportunity and as a challenge in China's digital health transformation. The case of Chengdu can act as a good example of how digital health applications could be scaled down and implemented into regional healthcare systems. The city has experienced massive investments in the digitalization of the healthcare system by establishing internet hospitals, implementing artificial intelligence diagnostics, and introducing the telemedicine portal ^[7]. These developments are notable especially in the rural themes and semi-urban settings of Chengdu, where reception of services in healthcare has traditionally been wretched.

The current status of Chengdu being one of the central focuses in the digital healthcare strategy proposed by China means that it is of great importance in deciphering patterns through which the digital health technologies can be used to address the issue of the disparity between rural and urban communities to provide them with equal abilities to receive healthcare services, achieve better health outcomes, etc. ^[8]. It is also worth noting that the city has received multifold assistance on the part of the government, which has contributed to the development of digital health solutions meant to reduce the burden of the traditional health system, enhancing service provision, and expanding so-called reach.

In this research, the focus on the implementation of digital healthcare technologies in Chengdu will be on the following: the use of telemedicine, mobile health applications, and the use of AI to aid diagnostics in the healthcare system in Chengdu. It shall examine the reasons why these technologies are embraced, the advantages they present in the area of accessibility and efficiency, and difficulties they continue to encounter during assimilation ^[9]. The paper shall also start with the investigation on the part of healthcare providers, platform developers, and policy-makers in addressing the regulatory and infrastructural impediments to digital health adoption.

In its intention to concentrate on Chengdu, the research is expected to shed useful light on ways in which a

digital healthcare solution might be streamlined to increase health outcomes not only in Chengdu but also in the rest of China and the world as a whole.^[10] It will also add to the general knowledge of what policies, strategies, and regulatory eco frameworks are required to facilitate the growth of digital healthcare services and can have an influence on the future development of healthcare delivery in China.

2. Theoretical framework

This research is embedded in two dominant theoretical frameworks Technology Acceptance Model (TAM) and the Digital Health Framework contributed by the World Health Organization (WHO) ^[11]. The two frameworks given are central to the process of comprehending the mechanisms and variables of the adoption and integration of the digital healthcare technologies in Chengdu, China, more precisely, to how healthcare professionals and patients perceive and adopt and use the digital healthcare tools.

The Technology Acceptance Model (TAM) is considered to be among the most popular models in the study of technology adoption, which was proposed by Fred Davis in 1989. TAM assumes that the leading factors in acceptance and use of new technology can be reduced to two categories: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness is the trust one has regarding a becoming of person when it comes to performance or gains when use of a particular type of technology is attained. Regarding digital healthcare, it may imply the perceptions of telemedicine, mobile health applications, or AI-based diagnostics tools by healthcare providers and patients that they lead to a better quality of care, make the provision of care more convenient, or improve efficiency in the field of healthcare ^[12]. When people assume that the implementation of technology is going to improve their healthcare or any reference to this experience, they tend to assimilate into its use.

The second major construct of TAM is Perceived Ease of Use, which corresponds to the extent to which a person considers that the use of a technology will be effortless. The technology that is easy to operate and understand has a higher probability of being adopted. This is especially important in healthcare, where healthcare providers and patients would be hesitant to utilize complicated systems that would demand much learning or work. As an example, a user-friendly telemedicine platform or a mobile health app will stand a better chance of gaining acceptance among patients and healthcare professionals, especially in those situations where digital literacy is a problem ^[13]. TAM can therefore be used to research the extent to which the personal perceptions of the usefulness and utility of the digital health tool will affect the rate of adoption.

Another contribution of the Digital Health Framework, developed by the World Health Organization (WHO), organizes a different macro-level view on digital health adoption. This model describes four blanket principles that need to be in place to achieve success with digital health solutions ^[14]. First, the WHO insists on national commitment to digital health. Governments have to give priority to digital health, shape national policies, and offer financial and technical assistance to create a sustainable digital health system. This specifically applies to the developing countries where the integration of digital health instruments is frequently impeded by infrastructure and resource constraints. WHO emphasizes the necessity to develop and introduce national digital health plans based on the local priorities and policy objectives, and resources.

Second, the WHO suggests that digital health should be considered as a means of an integrated approach toward digital health solutions, which means that they should not be limited to a single digital health programme but a single comprehensive strategy involving governance, health financing, and human capacity building. This comprehensive approach guarantees that digital health technologies are aligned with the current healthcare

settings, which increases the likelihood that the tool will be successfully adopted. As an example, telemedicine should be incorporated into the ordinary practices of healthcare facilities and healthcare management systems in such a way that it enables health professionals to freely switch between virtual and onsite interactions. Such a combined approach is needed for the ability to make digital health technologies scalable, sustainable, and successfully integrate them into health delivery.

The third principle is concerned with the adequate use of digital technology. The WHO emphasizes that it is essential that digital health solutions become available to everyone, without reference to his or her geographic location or socioeconomic status. This principle argues that there must be fairness in digital health device accessibility, whereby the vulnerable groups, like those who live in rural or underprivileged places, are not the ones left behind. Additionally, the privacy and security of data are also the core of this principle because the tools of digital health should protect the information of the patients to ensure trust and legal adherence.

Lastly, the WHO framework aims at responding to the challenges experienced by the developing nations in embracing digital health technologies, namely poor infrastructural facilities, digital illiteracy, and lack of technology access. The framework recommends strategic investment in infrastructure development, digital literacy, and accessibility to technology to eliminate such barriers. To be applied specifically in Chengdu, China, the WHO framework will support the evaluation of how effectively the healthcare system of the city can enable the adoption of digital health solutions and the identification of the spheres where additional investments are required, especially in the rural regions, where the infrastructure remains underdeveloped.

To recap, the Technology Acceptance Model (TAM) and the WHO Digital Health Framework have complementary views, which contribute to a better understanding of the digital healthcare technologies adoption and integration processes. TAM is user-centric and considers the user-side of how medical professionals and patients can assess the usefulness and properties of digital health platforms, whereas the WHO framework is more policy and system-level, taking into consideration the system-related requirements, which need to be in place to make digital health products successful. In combination, these frameworks give a general perspective on the ways digital healthcare technologies are implemented in Chengdu and can give useful information about the obstacles and the opportunities that influence their implementation into the healthcare system. All these theories together allow the current study to focus both on micro-level users' perceptions and macro-level issues, which have to exist to allow integration of digital healthcare in Chengdu, to get a full picture of the issues and possibilities presented by the adoption of digital healthcare in Chengdu.

3. Conceptual framework

The Conceptual Framework of the present work provides an orderly description of major concepts, themes, and constructs that are going to be used to analyze digital healthcare in Chengdu, China. Through it, the interrelations between the main variables in question, digital health technologies and processes of their adoption, the experience of their stakeholders, and policy development are going to be explained so that the single influence the combination of these variables has on the integration and impact of digital healthcare in China could be comprehended. The conceptual framework is built around the following key concepts and themes.

3.1. Digital healthcare technologies

Technologies that are included in this concept are telemedicine, mobile health applications, and AI-assisted

diagnosis. This is what the innovations that are the focus of the research are about: to determine their purpose and application in the Chinese healthcare system.

3.2. Adoption and diffusion of digital health

Here, the authors investigate this theme through leveraging these technologies and the ways of their adoption and dispersion in the healthcare ecosystem of Chengdu. It takes into consideration, e.g., the perceived usefulness and ease of application of these technologies (according to the TAM model) and the way of innovations diffusion in the healthcare system (described by the DOI Theory).

3.3. Stakeholder experiences

The given theme concentrates on the experience of diverse stakeholders in the implementation of and two-way mix of digital healthcare. The important stakeholders of concern are the healthcare providers, the patients, and technology platform developers, and the policy-makers. Then, with the perspective on them, there will be insights into how digital healthcare in Chengdu is regarded, adopted, and practiced. This is where TAM comes in to be the main factor in determining the level of acceptance of digital health technologies by the users.

3.4. Regulatory frameworks and policy development

This theme encompasses the policies and rules to either facilitate or hinder the incorporation of digital health technology. Here, major attention is paid to the government support of digital health through the WHO Digital Health Framework. It ensures the consistency of the technological developments and the healthcare and equity strategic intentions.

3.5. Health outcomes and accessibility of healthcare

The main aim of digital health adoption is to ensure increased accessibility and better outcomes of healthcare. The theme is interested in comprehending the scope of implications of digital health technologies on healthcare in Chengdu in urban and rural settings ^[15]. The concept relates well to the purpose of the study, whose objectives included analyzing the effects of digital healthcare on access and quality of care.

Disclosure statement

The author declares no conflict of interest.

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