

Internet Hospitals in China - Exploration of Business Models and Marketing Strategies

by

Xi Yang

Submitted to the MIT Sloan School of Management
in partial fulfillment of the requirements for the degree of

Master of Science in Management Study

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

May 2022

© Massachusetts Institute of Technology 2022. All rights reserved.

Author
MIT Sloan School of Management
May 6, 2022

Certified by.....
Juanjuan Zhang
John D.C. Little Professor of Marketing
Thesis Supervisor

Accepted by
Jacob Cohen
Senior Associate Dean for Undergraduate & Master's Program, MIT
Sloan School of Management

Internet Hospitals in China - Exploration of Business Models and Marketing Strategies

by

Xi Yang

Submitted to the MIT Sloan School of Management
on May 6, 2022, in partial fulfillment of the
requirements for the degree of
Master of Science in Management Study

Abstract

The development of China's Internet hospitals is not ideal in terms of quality despite rapid growth in quantity. The tech-based Internet hospitals operate with the Internet mindset, resulting in high operating costs and difficulties in profitability. Traditional hospital-based Internet hospitals suffer from a lack of technical capabilities, and operational talents, resulting in high operating costs and challenges in achieving better services. This paper explores the business models and market strategies of China's Internet hospitals by comparing the healthcare systems and the current situation of telemedicine in China and the United States, and using the PEST and SWOT analysis frameworks to analyze the Internet healthcare industry in China by interviewing industry experts, quantitative questionnaires and data analysis, combined with analysis of the core pain points of stakeholders related to healthcare activities. Unlike the patient-centered business model of most Internet hospitals today, this paper proposes to build an Internet hospital platform with hospitals and medical staff as the core. The profitable multi-win business model proposed in this paper is to charge patients, medical students and young doctors, pharmaceutical companies, insurance companies, and medical device companies. The doctors can get the consultation and treatment fees, and the hospital can use the hospital-side products for free. In the end, we propose the market strategy is to build a sustainable platform product with traditional hospital resources as the core. We provide the medical-side product mainly for medical students and medical workers under 50 years old. The hospital-side product is mainly for the top 100 medical institutions with medical schools. The patient-side product is mainly for the generation under the "One Child Policy" to facilitate patients' access to medical care.

Thesis Supervisor: Juanjuan Zhang
Title: John D.C. Little Professor of Marketing

Acknowledgments

When I finished this thesis, I felt a lot of emotions in my heart, and a sense of relief.

First of all, I would like to thank my thesis advisor, Professor ZHANG Juanjuan sincerely. I want to thank her for taking time out of her sabbatical year to discuss my thesis topic by video, guide, review, and revise my thesis.

I also want to thank YU Cong, Deputy Director of the Nursing Department of Shenzhen Second People's Hospital, who provided me with healthcare organization-related consultation, data collection, advice, and guidance during my thesis writing. It was only through collaboration with you that I could accomplish the business models and marketing strategies designed from the perspective of a healthcare institution.

I would also like to thank LU Qingjun, Director of National Telemedicine and Connected HealthCare Center, for his understanding and guidance during the thesis writing period regarding the practical use and current situation of the combination of emerging information technologies with the Internet hospital construction.

At the same time, I want to thank XIAO Deming, former Dean of Peking University Shenzhen Hospital. Thank you for teaching me much knowledge about the core pain points of current healthcare institutions and the core indicators of hospital operations. The completion of this thesis is inseparable from this knowledge.

I also want to thank Lachesis and the executives of Lachesis. Thanks for the opportunity that transition from a technical person to a manager to become more comprehensive and knowledgeable. Thanks for the support during my academic career.

Last but not least, I would like to thank my wife, JIANG Lili, and my family. Your great encouragement and support have been the most powerful backbone of my life, the cornerstone to go forward without any worries, and the motivation to strive hard.

The words of thanks are inexhaustible, and the sea of learning is endless. Goodbye, my studenthood!

Contents

1	Introduction	8
2	Comparison of Chinese and American Healthcare Systems	12
2.1	History of the American Healthcare System	12
2.2	History of the Chinese Healthcare System	15
2.3	Differences between American and Chinese Healthcare Systems	18
2.3.1	Differences in Political Systems	18
2.3.2	Differences in Healthcare Resources	18
2.3.3	Differences in Medical Insurance	19
2.4	Conclusion	20
3	Internet Hospitals in China and U.S.	21
3.1	Comparison of Service Provider Types	21
3.2	Comparison of Service Models	22
3.3	Comparison of Payment	24
3.4	Conclusion	25

4	PEST Analysis of China’s Internet Medical Industry	26
4.1	Political Factors	26
4.2	Economic Factors	30
4.3	Social Factors	33
4.4	Technological Factors	36
4.5	Conclusion	37
5	SWOT Analysis of China’s Internet Medical Industry	39
5.1	Strength	39
5.2	Weakness	44
5.3	Opportunity	47
5.4	Threat	49
5.5	Conclusion	52
6	Analysis of Current Internet Hospital Leaders in China and the U.S.	53
6.1	Telemedicine in the U.S.	53
6.1.1	Teladoc Health	54
6.1.2	Amwell	55
6.1.3	Doctor on Demand	57
6.2	Internet hospital in China	59
6.2.1	Ping An Good Doctor	60
6.2.2	China-Japan Friendship Hospital	64

6.3	Conclusion	69
7	Explore the Business Model for Internet Hospitals	70
7.1	The analysis of stakeholders in healthcare activities	71
7.1.1	Chinese Government	71
7.1.2	Insurance Company	72
7.1.3	Pharmaceutical Company	74
7.1.4	Medical Device Manufacturer	75
7.1.5	Traditional Hospital	76
7.1.6	Internet Hospital	77
7.1.7	Doctor	78
7.1.8	Nurse	80
7.1.9	Patient	81
7.2	New business model	82
7.2.1	Value Proposition	84
7.2.2	Customers	85
7.2.3	Core Assets	86
7.2.4	Customer Relations	86
7.2.5	Marketing Channels	87
7.2.6	Key Businesses	87
7.2.7	Revenue Sources	88

7.2.8	Key Partners	88
7.2.9	Cost Structure	89
7.3	Conclusion	89
8	The Analysis of Marketing Strategy	93
8.1	Segmentation	93
8.1.1	Doctor-Side Product	93
8.1.2	Hospital-Side Product	94
8.1.3	Patient-side Product	94
8.2	Targeting	95
8.2.1	Doctor-Side Product	95
8.2.2	Hospital-Side Product	99
8.2.3	Patient-Side Product	101
8.3	Positioning	103
8.3.1	Benefit	103
8.3.2	Concept	107
8.4	Conclusion	108
9	Conclusion	109

Chapter 1

Introduction

China, the world's most populous country and the world's second-largest economy, accounts for only 2% of the world's healthcare resources, which means that 1/4 of the world's population occupies only 1/50 of the healthcare resources. In terms of health care costs as a percentage of GDP, the United States is as high as 16.9%, Japan at 10.9%, the average of 38 members of the Organization for Economic Co-operation and Development (OECD) is 8.8%, while China is only 7.1%.¹ And China's high-quality medical resources are mainly concentrated in first-tier cities such as Beijing, Shanghai, Guangzhou, etc. Patients all over the country want to use high-quality medical resources, resulting in the phenomenon of difficult and expensive medical care, queuing for 3 hours to see a doctor for 5 minutes. In this respect, the Internet hospitals can solve the current medical problems of medical resources shortage in terms of preventive care, early detection care, health management, and remote consultation.

The concept of "Internet hospital" first appeared in China in 2015, and in 2018, China's National Health Commission clarified the admission management of Internet hospitals for the first time. Internet hospitals have grown from single-digit to thousands in just a few years. On the one hand, it is because of the solid support and favorable policy. On the other hand, the patient demands better medical service.

¹Source: OECD Health Statistics 2021, WHO Global Health Expenditure Database

Doctors can essentially achieve more effective management of patients through the Internet hospital, especially chronic patients. In addition, during the COVID-19 epidemic, the Internet hospitals achieved online health knowledge popularization, online medical consultation, the appointment of nucleic acid testing, and many other medical services. It is practical to decompose the pressure of offline diagnosis and treatment to help patients, especially chronic patients, with timely follow-up purchase of drugs, reflecting the value of Internet hospitals and the complement of physical hospitals.

Although the number of Internet hospitals in China maintains high growth, the current situation of Internet hospitals is not ideal. Significant problems are as follows. First, the management team of the technology-based Internet hospital copies the business model of the Internet company to operate. They excessively pursue traffic but cause high operating expenses, high customer acquisition costs, and difficulties in profitability. For example, Ping An Good Doctor has continuously lost money for seven years, and the loss further expanded to 1.539 billion yuan in 2021.² Second, the traditional hospital-based Internet hospitals suffer from a lack of top-level design, technical capabilities, and operational talents, leading to high operating costs and difficulty in achieving better results in medical services. Take the Internet hospital platform of the China-Japan Friendship Hospital as an example. The current online treatment price is only 50 yuan per time, while the investment cost of building an Internet hospital is tens of millions. This situation leads to severe losses and insufficient incentives for expert doctors to participate. Moreover, due to the shortcomings of technology and limited medical scenarios, it is not easy to achieve scale marketability. Therefore, finding a sustainable, profitable, and multi-win Internet hospital business model and market strategy is the key to Internet hospitals' development.

This paper explores the business model and market strategy of Internet hospitals in China by comparing the history and development of the healthcare systems in China and the US, comparing the current situation of telemedicine in China and the US, as well as using the PEST and SWOT analysis frameworks to conduct an in-

²Source: the 2021 Annual Report of Ping An Healthcare and Technology Company Limited

depth analysis of the Internet healthcare industry in China, through interviews with industry experts, quantitative questionnaires and data analysis, combined with the analysis of the core pain points of stakeholders related to healthcare activities.

Unlike the patient-centered business model of most Internet hospitals today, this paper proposes to build an Internet hospital platform with hospitals and medical staff as the core, providing medical and nursing side, hospital side, and patient side products. The business model proposed in this paper is to charge patients and provide consultation, treatment, drug and device sales, insurance, and subscription services. The doctor-side product charges medical students and young doctors for teaching, data use, and knowledge use, charges some doctors for promotion, and doctors can get consultation fees. Hospitals can use hospital-side products for free. However, we charge pharmaceutical companies for data usage, marketing, and promotion, insurance companies for data usage, channel fees, and platform fees from medical device companies. We aim to build a sustainable Internet hospital ecosystem through a profitable multi-win business model. The paper concludes with positioning the market strategy to build a sustainable platform-based product with traditional hospital resources as the core. The platform provides medical and nursing products mainly for medical students and medical workers under the age of 50, provides hospital products mainly for medical institutions with medical schools in the top 100 overall rankings, and provides products mainly for the generation under the "One Child Policy" to facilitate patients' access to medical care.

We organize the paper as follows: Chapter 2 compares the differences in the history and development of Chinese and American healthcare systems. Chapter 3 compares the current status of Internet hospitals in China and the United States in terms of service providers, online service models, and payment channels. In Chapter 4, we use the PEST analysis framework to analyze the macro environment of China's Internet healthcare industry in terms of political, economic, social, and technological aspects. Chapter 5 provides an in-depth, comprehensive analysis of the Internet healthcare industry using the SWOT analysis framework. Chapter 6 analyzes the

business models and market strategies of the current Internet hospital leaders in China and the United States as examples. Chapter 7 will find the stakeholders' core pain points and demands through an in-depth analysis of the stakeholders related to healthcare activities, draw on the strengths and eliminate the weaknesses of the current Internet hospitals, and explore a sustainable and profitable multi-win business model for Internet hospitals. Chapter 8 will analyze the market strategy through the STP tool to clarify the specific segment of the explored Internet hospital, the macro market strategy of target customers, and product positioning. Finally, it will conclude with a summary of the proposed Internet hospital's specific business model and market strategy and an analysis of the potentially tricky situations faced during the implementation process.

Chapter 2

Comparison of Chinese and American Healthcare Systems

2.1 History of the American Healthcare System

U.S. hospitals have grown for more than 250 years. The first hospital was Pennsylvania Hospital, founded in 1751 by Dr. Thomas Bond and Benjamin Franklin "to care for the sick-poor and insane who were wandering the streets of Philadelphia." The total number of hospitals in the United States in 2022 was 6,093, with 920,531 beds. Moreover, hospitals have become the core of U.S. healthcare services. The development and changes of U.S. hospitals are the combined product of the U.S. health insurance system, healthcare policy, and social development.

The early American hospitals were established mainly for charitable and welfare purposes, staffed primarily by volunteers and church personnel. Most hospitals were located in port cities like New York, Boston, and Philadelphia. The second hospital was the New York Hospital in Manhattan, New York, and the third was the Massachusetts General Hospital in Boston. In the early days, hospitals relied heavily on social donations and government support for social welfare, so some social donors and

government officials logically became hospital board members, and charitable organizations or the government usually appointed hospital administrators. Because of their charitable nature, hospitals in the United States did not charge fees until 1880. In the beginning, hospitals only accepted homeless or poor patients. However, as facilities and sanitary conditions in hospitals improved and medical equipment became advanced, some family physicians referred their patients to the hospitals and stayed in private hospital wards. Hospital wards were divided into a sizeable general ward with 40 beds and a private ward with only one bed.[1]

As doctors gradually rose in status in hospitals, there was an increasing conflict between them and the hospital trustees. This situation led to the emergence of the first private hospitals run by physicians. Doctors gradually changed from being competitors and antagonists to owners and developers of hospitals. The number of hospitals grew from 178 in 1872 to more than 4,400 in 1910. The eastern United States was the first region to develop economically, and capitalism and banking were the first to develop. Hence, the early church and government-run hospitals that relied on donations grew faster in the east. However, private hospital chains run by physicians grew faster in the western and southern United States. As private hospitals proliferated and physicians needed more help running them, the hospital management profession emerged. Hospital administrators evolved from trustees of endowments to physicians and a triad of trustees, physicians, and professional hospital administrators.

With the growth of hospitals, professional hospital management developed rapidly in the United States, and hospital management developed into a separate profession in the early twentieth century. 1899 The Association of Hospital Superintendents of the United States and Canada was founded in Ohio and renamed the American Hospital Association in 1906. In 1933, the American College of Healthcare Executives (formerly the American College of Hospital Administrators) was founded in Chicago, announcing that hospital administrators had their professional association and knowledge.

After World War II, the rise of third-party private health insurance payments and the passage of the U.S. Seniors Health Care Act led to a more market-oriented approach to hospitals. Prior to World War II, the primary funding source for hospitals was charitable funds, and most hospitals were also charitable institutions. After World War II, however, the 79th U.S. Congress passed the Hill-Burton Act in 1946, which required the U.S. government to provide funding and loans to hospitals to finance projects that would improve hospital infrastructure and bring each state to a ratio of 4.5 beds per 1,000 people. The Act made the U.S. government the primary funder of hospitals beginning in 1946.

The rise of managed care, widespread private health insurance coverage, and the growth of private hospitals in the 1990s contributed to a dramatic reduction in the size and number of public hospitals directly funded by the government. The government also hoped to reduce government overhead by reducing direct funding to public hospitals. During this period, a series of mergers between public and private hospitals also confirms the trend of government divestiture of public hospitals.

In general, U.S. hospitals have evolved in response to advances in medical technology, changes in the physician-hospital relationship, and the evolution of the health insurance system. As the core of healthcare delivery, hospitals play an irreplaceable role in a complex healthcare system. Hospitals need to take on more responsibilities. Hospitals are not only limited to meeting the needs of residents for medical care, but also include responsibilities for community health management, training the next generation of physicians, organizing charitable activities, and conducting research and clinical teaching. In addition, the development of high technology has made the future of hospitals more challenging and promising.

2.2 History of the Chinese Healthcare System

Two main parts of the development of the Chinese healthcare system are 1949-1978, the period between establishing the People's Republic of China (PRC) and proposed China's reform and opening-up policy, and after 1978, the implementation of China's reform and opening-up policy.

Since 1949, China has established a health care system based on the situation. This system consists of three general aspects:

1. Each county has a county hospital, an epidemic prevention station, and a maternal and child health station. Each town and village have a health office responsible for health prevention and medical treatment from the county to the village.
2. The commune's production team implemented coordinated medical care, and farmers can reimburse for medical treatment.
3. Barefoot doctors in rural areas do not receive much medical training but have the most basic medical knowledge and can handle some minor diseases.

These three parts were the first three-tier medical system established in China, with counties and villages. This three-tier medical system provided effective prevention and treatment of infectious diseases such as pneumonia, smallpox, cholera, and plague. It also laid the foundation for establishing a modern medical system in China with public hospitals. As a result, in 1949, China was one of the poorest countries in the world, and because of its poverty, life expectancy was only 35 years per capita. Furthermore, by 1978, although China's GDP per capita was only \$156, still one of the poorest countries in the world, life expectancy per capita had increased from 35 to 65.9 years.

From 1978 to the present, after the reform and opening up, China began to implement the reform and opening up by transitioning from a planned economy to a market

economy. As China's economy continued to grow at a high rate, life expectancy per capita in China also increased from 65.9 years in 1978 to 76.7 years. China's healthcare system, including medical insurance, also underwent a wholesale reform during this period. For example, previously, China has changed from full-coverage fully reimbursed public medical insurance. However, now the government only has basic medical insurance, covering all residents, but the cost of insurance consists of three sources: partly from the government, partly from the work unit, and partly from oneself. There is a threshold for insurance reimbursement. First, we can reimburse only when we spend a certain amount, and we should pay the cost below the threshold. If the medical costs are too high, the reimbursement ratio will gradually decrease as the cost increases. There is a new type of rural cooperative medical care in rural areas, where the government pays part of the cost and the farmers pay part of the cost. There is also a threshold amount to reimburse, and after reaching the threshold, we can reimburse at a certain percentage, and there is a capped maximum limit. Compared with the past, the proportion that individuals have to bear increases as income levels rise, and the proportion that the government bears decreases. There are no more rural barefoot doctors, but the three-tier medical and health care system still exists, i.e., county hospitals, town health clinics, and village health offices, which has not changed much.[8]

With the reform of China's health care system, the funding source for hospitals has also changed. Before 1978, all hospital investments and expenditures came from the government treasury. However, after the reform and opening up in 1978, only about 10% of hospital expenditures were financed by the government to reduce the government's financial input. The hospitals' medical income should cover the cost of maintaining hospitals by themselves. At the same time, the public service nature of hospitals is the same, so an extraordinary and distorted phenomenon has emerged in China's medical system. Namely, the registration fees and outpatient service fees for doctors are meager. Hospitals cannot rely on these revenues to pay doctors' salaries and maintain their operations, so they have to "feed the doctors with selling drugs,"

i.e., The hospital makes a profit by charging 20%, 30%, or more for wholesale drugs. At the same time, the cost of various tests is higher, and the hospital gains more from drugs and these tests. Under this situation, medical costs have increased significantly. Hospitals are prone to prescribe more unnecessary drugs or high-priced drugs to solve the problem of doctors' income, hospital operations, and infrastructure construction. The higher the price of drugs, the more surplus the hospital has. Moreover, hospitals tend to do more tests, and patients start with a series of tests no matter what they see, leading to a massive increase in the financial burden on patients. As a result, the higher the price of drugs set by enterprises and the more they sell, the more they earn, so there is an incentive to raise drug prices and bribe doctors, who can receive more kickbacks for prescribing more drugs, so rent-seeking corruption is widespread throughout the industry.

In addition, the patients are motivated to go to higher-level hospitals for treatment regardless of major or minor illnesses because of the low cost of registration fees and outpatient services fees, and higher-level hospitals for treatment without the need for referral to lower-level hospitals. Moreover, the more patients admitted to higher-level hospitals, the higher the income, so they are also motivated to receive patients. So, the patient visiting the lower-level hospitals are fewer and fewer, but the higher-level hospitals are more and more overcrowded. The quality medical resources are severely lacking, with frequent conflicts between doctors and patients. Nevertheless, in county hospitals, or lower-ranked hospitals, medical resources are wasted.

In general, China's healthcare system has changed according to hospitals' changes. However, this change has also brought about many problems, including high operating costs for hospitals, low revenue, and low income for medical staff. The current system has resulted in high costs for patients and bred corruption among medical staff. Low outpatient costs and the concentration of quality medical resources have led to a severe shortage of quality medical resources and frequent conflicts between doctors and patients. On the other hand, public medical institutions have many wasted medical resources.

2.3 Differences between American and Chinese Healthcare Systems

2.3.1 Differences in Political Systems

Chinese hospitals are public hospitals as the mainstay and private hospitals as supplements. The National Health Commission of PRC manages hospitals, including private and public hospitals with medical quality and hospital management. The Chinese government authorities appointed the management team of public hospitals.

The United States is primarily famous for its private hospitals. Each state government manages the state Department of Health, but the Department is only responsible for the administration and regulation of hospitals. The hospital committees manage their hospitals independently.

In contrast to the United States, the Chinese government plays the most decisive role in developing and reforming Chinese hospitals and the Chinese healthcare system. The Chinese government uses a high degree of centralized management of healthcare resources, including economic ownership, operation, access, and responsibility for allocating healthcare resources.

2.3.2 Differences in Healthcare Resources

China, the world's most populous country and the world's second-largest economy, accounts for only 2% of the world's healthcare resources, which means that 1/4 of the world's population occupies only 1/50 of the healthcare resources. The number of beds in medical and health institutions per 1,000 people in China is 4.55, and the number of practicing physicians per 1,000 people is 2.9.¹ The average supply of medical services far exceeds the demand. In terms of health care costs as a percentage

¹Source: Statistical Bulletin on Health Care Development 2020, National Health Commission

of GDP, the United States is as high as 16.9%, Japan at 10.9%, the average of 38 members of the Organization for Economic Co-operation and Development (OECD) is 8.8%, while China is only 7.1%.² And China's high-quality medical resources are mainly concentrated in first-tier cities such as Beijing, Shanghai, Guangzhou, etc. Patients all over the country want to use high-quality medical resources, resulting in the phenomenon of difficult and expensive medical care, queuing for 3 hours to see a doctor for 5 minutes. Patients cannot communicate with their doctors in a comprehensive and detailed manner for consultation. The doctor-patient relationship gradually deteriorates in the long run, and it is challenging to improve medical standards.

In contrast, the U.S. has high quality, abundant, and even health care resources. The United States is very different from China in terms of the system of access to medical care. The appointment system in the U.S. ensures that patients have full access to medical resources during their visits and that the medical staff has enough time to provide the best possible service to the patient. Patients are seen on a one-on-one basis in the privacy of an outpatient clinic, usually taking about 45 minutes for an initial visit and about 20 minutes for a follow-up visit, which may take longer in complex cases. In the long run, patients trust their doctors more, and doctors better understand the individual differences in diseases.

2.3.3 Differences in Medical Insurance

China's medical insurance system mainly consists of three parts. One is the labor insurance medical system applicable to enterprise employees, the second is the publicly funded medical system applicable to the staff of institutions and institutions, and the third is the cooperative medical system applicable to rural residents. The state treasury fully covers publicly funded medical care, and individuals do not need to pay for it. Labor insurance medical care is managed by the enterprise, expended in

²Source: OECD Health Statistics 2021, WHO Global Health Expenditure Database

the welfare costs. The cost of rural cooperative medical care, shared between the collective and the individual, is more limited. Commercial insurance is currently only available as a supplement.

The U.S. healthcare insurance system has three main components. The first is the publicly funded health care system, mainly for veterans, active-duty military, and Indians. This part mainly provides health insurance for about 30% of Americans, including the elderly, the disabled, children, the poor, veterans, i.e., the socially disadvantaged groups of the publicly funded health insurance program, to ensure social equity. The second part is social health insurance. One is the U.S. poor Medicaid, mainly by the U.S. federal government and the state government cooperation to provide medical services for low-income people insurance. The other is the federal health care insurance (Medicare), which is the U.S. federal government for the elderly over 65 years old, disabled people, or permanent kidney failure patients to provide government health insurance. The third component is commercial health insurance, which commercial insurance companies provide for working people with income. Of these the third components, commercial health insurance is the dominant one.

2.4 Conclusion

After comparing the history and development of medical systems in China and the United States, we can conclude that the Chinese government will continue to play a leading role in the development of Internet hospitals. Second, the pattern of medical institutions dominated by tertiary hospitals will not change anytime soon. It is essential to fully and rationally utilize the quality resources of tertiary hospitals. Furthermore, it is worth learning from the U.S. medical development path, especially about the role of commercial medical insurance, the benign market pattern, and the doctor-patient relationship. We also see from the U.S. healthcare development path that China's healthcare market will continue to improve and has great potential in the future.

Chapter 3

Internet Hospitals in China and U.S.

3.1 Comparison of Service Provider Types

Usually, there are three main types of service providers in China:

1. Internet hospitals operated by public hospitals. The construction of Internet hospitals in public hospitals can be designed and developed by themselves, cooperated with communication operators and other cross-industry cooperation, or built by Internet medical enterprises.
2. Internet hospitals operated by Technology companies. In the fight against the epidemic in 2020, Internet medical enterprises such as WeDoctor and AliHealth played an essential role in integrating national medical resources to serve remote and backward areas.
3. Internet medical service platforms were established by relying on local governments and digital government platforms. In 2020, most local governments opened special services to prevent and control the COVID-19 on their digital government platforms. Some governments even integrated local Internet hospital resources to establish regional Internet hospital platforms.

At present, China's Internet hospitals are mainly operated by public hospitals. Although there is the rise of online Internet medical companies such as Ping An Good Doctor, which has won many users, Internet hospitals' whole pattern, mainly public hospitals, has not been broken.

Telemedicine companies occupy the dominant position in the U.S. Although the online medical industry in the U.S. mainly consists of online medical platforms of telemedicine companies, online medical platforms of health insurance companies, and online medical platforms of hospitals/medical groups, the online medical platforms of health insurance companies and hospitals/medical groups are supported mainly by online medical enterprises. For example, Amwell, a giant online healthcare company, has 150 million health insurance subscribers and serves more than 55 health insurance plans, 240 medical groups, and more than 2,000 hospitals. Another example is Teladoc, the world's only telemedicine company covering all nursing care areas.

3.2 Comparison of Service Models

The Internet hospitals in China are divided into two main modules of online services. First is the original business of Internet hospitals. It mainly includes online consultation and online diagnosis and treatment (limited to some common diseases and chronic disease follow-up). Online consultation has become the most frequently used and mature service model in China's online medical, and it is also the earliest service model of Internet hospitals. Initially, online consultation service was not included in the scope of medical insurance payment, and individual doctors set the price of online consultation service. Furthermore, the Internet medical platform would give some pricing references, and users could freely choose doctors for graphic consultation, telephone consultation, and video consultation according to their needs. The online consultation business is closely related to the medical insurance policy. Before the outbreak of COVID-19, medical insurance only covered a few services in Internet hospitals. After that, health insurance covered more and more services of Internet

hospitals. These Internet hospitals implemented the same health insurance payment policy for their online and offline treatment programs. Due to the impact of the epidemic and the adjustment of the health insurance payment policy, some Internet hospitals experienced a surge in the online treatment business. Many new users experienced the one-stop service of online follow-up consultation, e-prescription, and home delivery of medication. The COVID-19 epidemic led to the rapid growth of this business segment and cultivated the user for subsequent market expansion. The second is the online platform special for COVID-19. During the epidemic, telemedicine companies and Internet hospitals established special services for COVID-19. These services include free online consultation, psychological counseling, and health education, which deepened users' awareness of the COVID-19 virus and significantly eased social tensions.

Telemedicine in the United States provides mainly non-emergency services, and the most common services include three major categories: common diseases, psychological diseases, and psychiatric disorders. Most telemedicine platforms provide roughly the same online services. The health insurance policy design for online and offline visits is the same. The patient's out-of-pocket costs (registration fees, deductibles, and co-payments) depend on their health insurance plan. The registration fee for the same item is not the same across Internet medical platforms. The registration fee for the same item also varies from platform to platform. Online healthcare platforms can write e-prescriptions for patients throughout the United States, except for prescriptions for controlled substances prohibited by federal law from being sold online. When a patient begins a visit, the online healthcare platform directs the patient to a pharmacy online. Once the physician issues the online prescription, the patient can pick up the medication offline at the selected pharmacy or have it delivered to their home. Some online pharmacies have partnered with health insurance companies to provide free same-day delivery to patients.

3.3 Comparison of Payment

National health insurance is almost a single payment system. Furthermore, it controlled the future of this market. The spurt of growth in China's online healthcare market during the COVID-19 outbreak was aided by the rapid follow-up of health insurance policies. In August 2019, the National Health Insurance Administration issued a document clarifying equal health insurance payment policies for online and offline items. However, the overall pace of advancement was slow, with only a few regions such as Shanxi, Shandong, Jilin, Sichuan, and Guangdong introducing related pricing policies. In February 2020, Wuhan, Zhejiang, Tianjin, Jiangsu, and Shanghai decided to include some online medical services of Internet hospitals in the scope of medical insurance payment during the epidemic. On March 5, the State Council issued "Opinions on Deepening the Reform of the Medical Security System", which stated that they would support the development of new service models such as "Internet+medicine". All of these will bring great policy dividends for the subsequent development of the Internet medical industry.

The U.S. has a multi-care payment system, and each health insurance plan does not have the same reimbursement policies for online medical care. Before the outbreak of COVID-19, some health insurance companies had already provided online medical services to participants. The service included online medical care in the scope of health insurance payment and implemented the same reimbursement policy as offline medical treatment, but participants were generally not very motivated. After that, most commercial health insurers offered online healthcare services to their enrollees. Among other things, Medicare has also eased the geographic restrictions and broadened the technical requirements for enrollees to access online healthcare. At the same time, most companies have eliminated the co-payments (registration fees, deductibles, and co-payments) for online care. Some companies have eliminated registration fees, and some have implemented the same reimbursement policies for online and offline visits. Regarding the length of fee waivers, the length of online medical fee waivers offered

by health insurance companies ranged from 1 to 3 months. Most health insurance companies granted participants three months of fee waivers during the outbreak. In terms of the scope of services covered by the fee waivers, most health insurers waived all online medical services provided by in-network providers. In contrast, few insurance companies waived testing and diagnostic services or essential medical services related to COVID-19. The introduction of Medicare fee waivers during the epidemic has boosted the development of online healthcare in the United States.

3.4 Conclusion

By comparing the differences between the Internet hospitals in China and the U.S., we can see significant differences in the types and models of service providers in both countries. Due to the difference in the medical system, Chinese Internet hospitals cannot change this status quo in a short time. However, after comparing the payment models, we can conclude that the diversified medical payment system and the coverage of medical insurance, especially commercial insurance, to the Internet medical business have played a very positive role in promoting the whole industry. Therefore, we should not ignore the position of insurance companies in the discussion of the business model of Internet hospitals.

Chapter 4

PEST Analysis of China's Internet Medical Industry

4.1 Political Factors

China faces an aging society, unfair distribution of resources, severe conflicts between doctors and patients, and a shortage of health insurance. China's GDP is growing at a high rate, but life expectancy per capita grows slowly. On the political level, the Communist Party of China (CPC), as the only ruling party, made the critical judgment that "socialism with Chinese characteristics has entered a new era" at the 19th National Congress. And then made a new overview of the changes in the central contradictions of Chinese society in the new era: "The main contradiction of Chinese society has been transformed into the contradiction between the people's growing demand for a better life and unequal and insufficient development".

Usually, the leading social contradictions of the CPC are the highest issues that need to be solved in national politics. Moreover, medical care is an essential part of the good life. The current imbalance of medical resources, the current medical system under the conflict between doctors and patients are unbalanced and insufficient

development and the contradiction of the people's demand for a good life. Therefore, from the macro-political platform, the future to solve the current medical conflicts, the political level gives the direction of guidance, and the Internet medical is a very effective means and tool to solve the current medical problems.

In China, healthcare is a special and cautious industry, so the political factor has been the most critical factor driving the development of the industry as a whole. The early development of the Internet medical industry has also been subject to the lack of policies and repeated regulation. Since 2013, the country gradually entered the incubation period through exploration from the blank period of the policy and entered the high-speed development period of the policy in 2017, which was released successively from the regulation, application, and pilot in many aspects, especially the application period made to know and guide. The COVID-19 also accelerated the landing of the national policy, 2020 to date, the country released the policy on Internet medical entered the outbreak period.

In September 2013, the document "Several Opinions of State Council on the promotion of health services development" is the first time proposed that promoting healthcare services informatization is a significant task. Also, this indicates that "where the laws and regulations are not explicitly prohibited areas, are open to social capital, and continue to expand the open areas." Since then, the development of the Internet medical field from a single medical information field began to turn to the treatment, drug sales, and other fields, opening a new era of Internet medical.¹

In October 2016, the State Council issued the "Health China 2030" planning outline. This document requires the main principles of adhering to government-led market mechanisms, accelerating the pace of reform of critical links, breaking the fetters of ideology and the fences of solidified interests, removing institutional barriers, and playing the role of scientific and technological innovation and information technology. The government will play a leading role in supporting the formation of a system to promote the health of all people. This planning outline marks the first time Internet

¹Source: The website of State Council of the PRC

medical care is mentioned at the national strategic level.²

From 2017 to 2020, Internet medical policy entered a period of development. The National Health Commission, the National Health Insurance Administration, the General Office of the State Council, and various local health management and other relevant agencies have issued several policies and government plans at various levels, such as regulation and technology application.[6] Besides, all the policies focus on application-level support and guidance. For example, in May 2020, the National Health Commission issued the "Notice on Further Promoting the Development and Standardized Management of Internet Medical Services " to promote further the integration and development of Internet technology and medical services and play a positive role in the Internet medical services. All regions should adhere to the bottom line of medical quality and patient safety, constantly regulate Internet hospitals and treatment access and execution management, and strengthen supervision.³

After 2020, the Internet medical policy enters a tumultuous period, and the policy in that period mainly focuses on the Internet medical insurance payment norms. The Internet medical is fully promoted to the ground application.

In June 2021, the General Office of the State Council "Opinions on Promoting the High-Quality Development of Public Hospitals" pointed out the vigorous development of telemedicine and Internet diagnosis and treatment, deepening medical reform 2021 essential tasks proposed to promote the "Internet + medical health further". Internet hospitals and Internet diagnosis and treatment services are gradually penetrating the fields of medical reform and high-quality development of public hospitals, and the policy further affirms the vital position of Internet medical care in the medical service system.⁴

In terms of Internet hospitals and Internet treatment, 31 provinces have issued policies to guide the development of "Internet + medical health", mainly the "Implementation

²Source: The website of State Council of the PRC

³Source: The website of National Health Commission

⁴Source: The website of State Council of the PRC

Opinions" or "Action Plan", and set development goals for recent years. Twenty-four provinces and municipalities nationwide have issued regulatory policies, including the Internet Hospital Management Measures (for trial implementation) or other norms and guidelines, proposing specific access, regulatory and other measures.⁵

From the insurance side, in August 2019, the National Health Insurance Administration (NHA) issued the "Guidance on Improving the Price of 'Internet+' Medical Services and Health Insurance Payment Policies". In July 2020, the General Office of the State Council issued "Implementation Opinions on Further Optimizing the Business Environment and Better Serving Market Subjects", and in October 2020, the National Development and Reform Commission, the Ministry of Industry and Information Technology, and 14 other departments jointly issued the "Work Plan for Expanding Domestic Demand and Promoting Consumption in the Near Future", both of which proposed to include eligible Internet re-care services in the scope of medical insurance reimbursement. By 2021, the Internet medical insurance payment is written into many weighty policies. The relevant research shows that 43% of Internet hospitals can realize medical insurance payments. The overall coverage rate is not yet more than half, but the medical insurance coverage policy is published rapidly.

From the medicine side, the policy impact is undoubtedly the biggest in pharmaceutical e-commerce. The Internet medical-related policies are focused on the field of pharmaceutical e-commerce. The policy ended, experienced an explicit ban initially, later allowed qualified pharmaceutical enterprises online sales of non-prescription drugs, and later allowed third-party platforms to sell non-prescription drugs and a series of explorations. In April 2021, the State Council issued the "Six Stability" policy to improve the services' quality further. In April 2021, the State Council issued the "Opinions on Further Work on the Reform of Management and Service" to ensure the authenticity and reliability of electronic prescriptions. This document allowed online sales of prescription drugs other than those under exceptional management, marking the official liberalization of the policy on online sales of prescription drugs.

⁵Source: the Chinese government website

Restrictions on the online sale of prescription drugs formally liberalized. This document formally establishes the most central position of pharmaceutical e-commerce in Internet medicine.

In general, national policy is very active in promoting the development of the Internet industry. The last ten years have introduced many related policies and systems. The policy system is also better and better. The timely introduction of these policies has indicated the direction of the development of the Internet medical industry. Furthermore, it increased the enthusiasm and operability of hospitals and related enterprises to participate. However, since the introduction of policies, the industry has not yet entered a stable period and is still in the expansion period.

4.2 Economic Factors

Since the reform and opening-up, China's economy has shown strong momentum. Since 1992, after Deng Xiaoping's southern tour, China's economy started to grow at a high rate, and in 2000, China's GDP was US\$1.2 trillion, with a per capita of only US\$959. Since China joined the World Trade Organization (WTO) in 2001, it has become the world's largest exporter and the second-largest importer. Between 2000 and 2010, China's economy grew at an average annual rate of over 10%, and in 2010 China's GDP totaled US\$6 trillion, surpassing Japan to become the world's second-largest economy. 2021, China's GDP grew by 8.1% over the previous year, ranking among the world's major economies in terms of economic growth. The total economic volume of China reached 114.4 trillion yuan, exceeding 110 trillion yuan, and at the average annual exchange rate, reaching 17.7 trillion U.S. dollars, firmly ranking second in the world and accounting for an estimated share of more than 18% of the global economy. GDP per capita exceeds 80,000 yuan, or US\$12,551, and although it has not yet reached the lower limit of the per capita level of high-income countries, it is approaching it year by year. 2021 China has already surpassed the

world's GDP per capita level.⁶

High economic growth has also meant a significant increase in state revenues and a significant increase in national income. As a result, the state has also increased its investment in health care in recent years. As China's health care level develops, healthcare costs, medical institutions, beds, and other resources are continuously rising. Figure 4-1 has two sub figures, fig. 4-1(a) is the number of hospitals and beds and fig. 4-1(b) is the trend of health expenditure per GDP.⁷

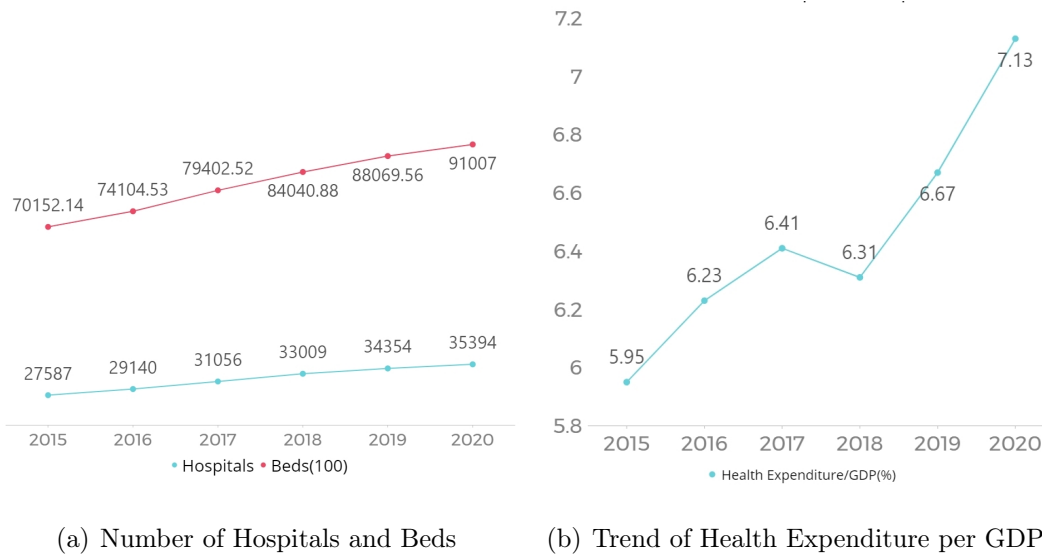


Figure 4-1: The Development of China's Healthcare

With the rapid development of the country's economy and the rapid growth of GDP, the per capita disposable income of the nation's residents has also increased simultaneously. In 2020, the per capita disposable income of the nation's residents reaches 32,189 yuan, compared with the cumulative increase of 1 time in 2010. At the same time, by 2020, the number of people covered by basic pension insurance in China reaches 999 million, and the number of people covered by basic medical insurance in China reaches 1.36 billion.⁸

As people's disposable income increases and basic livelihood security improves, peo-

⁶Source: The website of the World Bank

⁷Source: Data from National Bureau of Statistics

⁸Source: Data from China Banking and Insurance Regulatory Commission

ple's medical needs are also increasing. In 2019, the number of visits to medical and health institutions in China was 8.72 billion, an increase of about 49.37% compared to 5.84 billion in 2010. The number of medical visits per capita in China increased from 4.4 visits in 2010 to 6.2 visits in 2019, an increase of 40.9%. Total national health expenditure increased from \$1.8 trillion in 2009 to \$5.8 trillion in 2018, an average annual increase of 14.2%, and total per capita health expenditure increased from 1,314 yuan to 4,148 yuan.⁹ The superb market size and strong growth in healthcare demand are also meaningful opportunities for the development of Internet healthcare.

China's GDP share of healthcare investment in 2020 was 7.1%, the US 18.3%, the UK >9.7% (2017), and the world average >10% (2016). In fact, with the steady growth of China's GDP, Chinese residents' demand and consumption capacity for healthcare services is increasing year by year, while the scale of the healthcare services market is also expanding. China's healthcare system and medical security system are improving and perfected to a large extent to meet this demand-side growth. However, objectively speaking, the difference between China's total investment in healthcare and that of other developed countries (the world average) is still significant (both in relative and absolute terms). Therefore, while China is steadily improving its overall healthcare capacity and services, it needs to strengthen its total healthcare investment further. Only this will meet the growing and broader needs to further adapt to demographic changes or counteract the risks posed by epidemics and accomplish the ambitious goal of a healthy China.

Although the domestic economy is proliferating and the per capita disposable income of the nation's residents is steadily increasing, the imbalance in the nation's economic development has also led to an uneven distribution of healthcare resources across the country. The huge gap in per capita disposable income between urban and rural residents has also led to a massive gap in investment in healthcare consumption. For example, urban residents' per capita disposable income exceed 40,000 yuan in 2020, while rural residents had only 16,000 yuan. This situation further exacerbates the

⁹Source: Data from National Health Commission

national geographic disparity in healthcare levels. While the Internet has the innate characteristic of breaking geographical restrictions, with the support of national policies and transfer payments, Internet healthcare has the net to become a critical grip to solving this problem.

In addition, the Internet industry revenue and user growth are slowing down year by year, primarily in e-commerce, social, games, search, and other Internet businesses. The current Internet competition will gradually step into the stock market. The Internet medical industry has undoubtedly found a new market segment growth point.

In general, China's economy is growing at a high speed, but the value of healthcare investment to GDP is low, higher than India only, among the world's ten largest economies. According to the current national investment data on health care, we can expect that the national financial investment in the healthcare industry will further increase in the future. The growth of China's per capita disposable income and per capita savings data also provides an economic basis for the Chinese people's spending on healthcare. Furthermore, the Chinese people's awareness and health concerns will further increase, which will become the main factor further promoting the development of China's medical health industry. Therefore, the current macroeconomy of China is very friendly and full of opportunities for the development of Internet healthcare.

4.3 Social Factors

With a population of 1.4 billion, China is the most populous country globally, accounting for a quarter of the world's population, and the size of China's Internet users exceeds 1 billion. From January to November 2021, the total number of visits to medical and health institutions nationwide was 6.05 billion and the detail is in Figure 4-2. These data shows that the market for Internet healthcare in China is enormous.

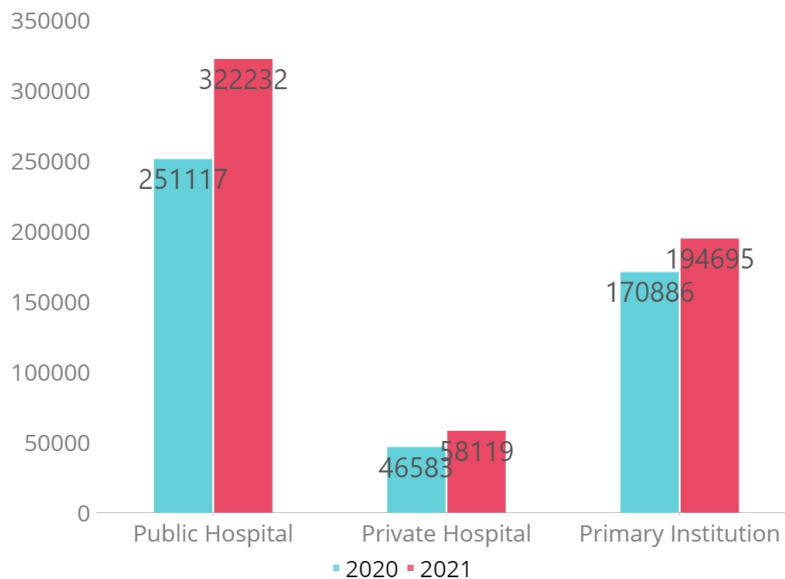


Figure 4-2: The Volume of Medical Services in Healthcare Institutions(10 thousand)

According to the data of the 7th China Census, China's population over 60 years old has exceeded 260 million, and the proportion of people aged 65 and above exceeds 7% in 30 of China's 31 provinces, with the proportion of the elderly population aged 65 and above exceeding 14% in 12 of them.¹⁰ The data shows that the aging of China's population has further deepened. Coupled with China's "One Child Policy", the increasing pressure on working life, and the continuing decline in fertility rates, all contribute to the continued pressure on China to achieve a balanced population in the coming period. The demand for medical care continues to increase due to aging. With the burden of children on the elderly, more efficient, convenient, and flexible Internet medical care is also in urgent need of development, harboring a vast market space.

The outbreak of COVID-19 in 2020 has gradually developed into a regular occurrence by now. During the COVID-19, especially in the early stage of the outbreak, the epidemic greatly affected human health and daily life. Many medical resources were occupied, even causing paralysis of the medical system in some places. Due to the

¹⁰Source: Data from National Bureau of Statistics

robust transmission of the virus, hospitals have become high-risk places, resulting in many patients being unable to seek regular medical treatment. In such a particular period it also powerfully stimulates the development of Internet medical care. China's Internet medical market is approaching 200 billion yuan in 2020, with a year-on-year growth rate of more than 60%. From the perspective of medium and long-term market development trends, optimizing and upgrading clinical information systems and constructing and improving regional medical platforms will bring continuous market demand for the Internet industry. Catalyzed by the COVID-19, the online consultation market, the most representative segment of Internet medical care, has also developed rapidly. Similarly, comparing data from the U.S., according to Frost & Sullivan's forecast, the 5-year CAGR of the telemedicine industry rapidly soared to 1,200% from 38% in 2019 due to the epidemic.¹¹ In June 2020, the initial outbreak of the epidemic in the U.S., telemedicine usage was 45 times higher than in February 2020 prior to the U.S. epidemic. Overall, the COVID-19 epidemic has provided a significant boost to the growth of telemedicine globally, and this effect is likely to be permanent. It also reflects the essence of Internet healthcare, which cannot be developed in isolation from the essence of healthcare.

As China gradually enters an aging society and the uneven development of the population caused by policies such as the "One Child Policy", the demand for Internet healthcare from the overall social level is growing for users on the demand side. In addition, social emergencies such as the global outbreak and the spread of the COVID have tested the global medical system and significantly promoted telemedicine development. Therefore, it is also strongly favorable to the future development of Internet medical from the social level.

¹¹Source: Frost & Sullivan's research

4.4 Technological Factors

China's Internet industry is snowballing, and the country is investing heavily in Internet infrastructure. China has built the world's largest fiber-optic network, 4G and 5G independent networks. As of June 2021, the number of Internet users in China is 1.011 billion, of which 1.007 billion are cell phone users. The proportion of domestic cell phone users to the overall Internet users has reached 99.6%. 2020 revenue of listed Internet companies in China reached 3.4 trillion yuan¹², and the number of listed companies increased from 116 to 190. Overall, China has excellent Internet infrastructure, industrial scale, and good user habits, which provides excellent soil for the growth of Internet healthcare.

5G and IoT technologies enable the transmission and interconnection between portable medical devices and servers. These technologies promote the development of portable intelligent medical devices and expand Internet hospitals' service scope and application scenarios. These smart devices can help medical staff grasp and monitor patients' daily vital signs and common health indicators more easily and quickly. Moreover, they enable a series of scenarios, such as remote diagnosis and treatment, especially in the case of follow-up consultations, where common health indicators are transmitted to doctors in real-time. Another example is the emergency call. When an emergency is encountered, help can be sought through a key, and location sharing allows intelligent rescue first aid scenarios.

Artificial intelligence, big data, and cloud computing will provide powerful technical support in assisting diagnosis and treatment, chronic disease management, testing, diagnosis image recognition, and graded treatment and can even change the industry. Doctors will reduce the workload and focus more on seeing and saving people. From the patient's perspective, they will save much waiting time caused by the shortage of medical resources, reduce the time and effort caused by the information gap, and can even complete follow-up consultations and diagnosis and treatment of minor diseases

¹²Source: Data from Ministry of Industry and Information Technology

without leaving home. From the hospital's perspective, the service format is more flexible, diverting some patients with minor illnesses and reducing the conflict between doctors and patients.

With the maturity and broad application of technologies such as the Internet, 5G, big data, cloud computing, Internet of Things, artificial intelligence, virtual reality, and so on, a solid foundation for the development of Internet hospitals has also been laid. Moreover, China is at the forefront of the world in these technologies.

Chinese technology giants Ali Health, Baidu Health, Tencent Health, and JD Health have stepped into the medical field. Their technological advantages on the Internet will also be brought into the healthcare industry. The cloud platforms of Ali and Tencent are currently the two most powerful cloud computing platforms in China, which provide a robust technological architecture and computing base for Internet healthcare.

Currently, China and the United States are neck and neck in technology. China is even moving faster regarding medical technology due to different sensitivities to personal data. Many companies have already applied cutting-edge technologies to clinical settings and built differentiated Internet healthcare business models. Therefore, with the further development of technology, the potential of Internet healthcare will be fully realized, and the application scenarios will be more abundant, thus promoting the further development of the whole industry.

4.5 Conclusion

Using the PEST analysis framework, it is easy to see that under national strategic guidelines such as Healthy China and New Medical Reform, governments have successively issued intensive support, exploration, and regulatory documents about Internet healthcare. Combined with the fundamental problems that the country needs to solve, the shortage of medical resources, the unfair distribution of medical resources, the low

level of medical services, and the high cost of medical care, the Chinese government supports and encourages the development of Internet healthcare from a political perspective. With the rapid development of China's economy, people's living standards and demand for quality of life and health are increasing. China's total GDP does not match the investment in medical care and life expectancy per capita. So the market demand for medical care from China's economic dimension will continue to grow in the next ten years. The Internet medical care as a medium and tool can solve the contradictions on the supply side in terms of efficiency and service level. On the social level, with the advent of China's aging society, demographic imbalances and medical risk issues such as potential infectious diseases have become more prominent. From the demand side, the people's demand for quality and graded healthcare far exceeds the current supply side. Therefore, from a social perspective, the growth potential of Internet healthcare is enormous. On the technology side, China has all the technical reserves for Internet healthcare from essential technologies such as the Internet, IoT, artificial intelligence, and cloud computing. Therefore, through PEST analysis, the Internet medical industry will become the new mode of people's medical care in the next ten years. Internet medical care will continue to change people's lives like the rich and convenient life services such as bike-sharing, take-away, and taxi-hailing software. Internet medical care will also meet the people's essential healthcare requirements, provide quality services as much as possible at a lower cost, and finally achieve graded treatment. We can take advantage of the efficiency, openness, and low cost of Internet medical care to achieve the strategic goal of a healthy China.

Chapter 5

SWOT Analysis of China's Internet Medical Industry

5.1 Strength

According to the PEST analysis, we know that there are many pain points in Chinese healthcare, and if Internet healthcare can solve the problems, its advantages will be visible.

1. **Internet healthcare can be a good solution to the problem of uneven distribution of medical resources and imbalance between supply and demand**

Two perspectives can explain the current uneven distribution of healthcare resources and the imbalance between supply and demand. First, in terms of medical resources, China's population currently accounts for about 25% of the world's population, while medical and health resources account for only 2% of the world's share. In this only 2% of medical resources, and about 80% of them are concentrated in cities. Moreover, large hospitals in big cities often concentrate on high-quality medical talents, advanced medical equipment,

cutting-edge medical technology, and other resources. Although urbanization is growing every year, quality medical resources in large cities appear to be too concentrated, such as the top 100 hospitals in China, with Beijing, Shanghai, and Guangzhou accounting for 48%. Second, as China's economy improves, people's demand for quality healthcare increases, which has led to people going to hospitals for major and minor illnesses and wanting to go to the best local hospitals. This situation has led to a strain on medical resources in tertiary hospitals, with frequent all-night queues for registration and a shortage of inpatient beds, among other problems.

If the Internet hospital can be genuinely built and perfected, it can solve the uneven distribution of medical resources and imbalance of supply and demand. For example, it usually takes half an hour to go out, half an hour to stand in line, and half an hour to pay the bill. It only takes 10 minutes for the doctor to focus on the consultation and the patient to save extra time consumption in an Internet hospital. Internet hospitals also break geographical restrictions. No matter where we are, as long as we can provide medical insurance cards or ID cards, we can enjoy services in the Internet hospital, mainly solving the inequitable distribution of medical resources. The doctors on the supply side also focus on consultation. Doctors work more efficiently with electronic information and an intelligent electronic medical record system. So from the supply side, it improves the efficiency of services, especially for common diseases, chronic diseases, and patients who need long-term follow-up, which can significantly solve the current imbalance between medical supply and demand. This example also reflects the advantages of Internet hospitals, such as high efficiency, cross-regional, and resource sharing.

2. Internet medicine can solve the problem of visiting large hospitals regardless of major or minor illnesses and promote the construction of a hierarchical medical system

Part of the reason for the overcrowding in the large hospitals is that as economic

incomes rise, people's demands for quality of life and medical care are increasing. Everyone wants to go to the best hospitals and the best doctors. Even minor illnesses want to be diagnosed by highly respected doctors. As a result, medical resources are even tighter under the already scarce medical resources. In order to solve this situation, the "Hierarchical Medical System" was born, i.e., the hierarchy according to the priority of diseases and the difficulty of treatment, with medical institutions at different levels undertaking the treatment of different diseases, gradually realizing the medical process from general practice to specialization. At the same time, medical consortia integrate medical resources in the same region, usually through a regional tertiary hospital and secondary hospitals, community hospitals, and village hospitals to form a medical consortium. The medical consortia aim to solve the problem of people's difficulties in accessing medical care. Fever and cold will no longer have to crowd into tertiary hospitals. In small hospitals can also be solved. From the perspective of China's medical system reform, this is a strategic change. Ma Xiaowei, secretary of the party group and director of China's National Health Commission, said, "The day when the hierarchical diagnosis and treatment system is realized is when China's medical and health system reform is successful. Internet medical care is an indispensable medium to realize natural hierarchical medical treatment.[4] First of all, Internet healthcare provides technical support for hierarchical diagnosis and treatment. Software and data sharing platforms allow doctors and patients to make two-way referrals and quickly realize data sharing among hospitals. Each hospital is no longer an isolated island of information. Patient data can be recorded, observed, and shared. The channels are open so that patients can get the best quality resources when they need them. In this way, patients will not seek medical treatment blindly. Second, Xu Liang, vice president of Tongren Hospital, once said, "More than half of the patients who register with me do not need to visit me, which is a waste. Resources are tight not only because of scarcity but also because of mismatch." Internet healthcare can efficiently triage diseases, suggest places to visit based on disease types, and

genuinely recommend and assign places to visit intelligently based on medical resources and specialty attributes. In addition, Internet healthcare allows the application and guidance of quality medical resources from higher-level hospitals to lower-level hospitals, making it easier to conduct remote consultations with other doctors. Therefore, Internet hospitals can effectively alleviate the over-occupation of medical resources, rationalize resource allocation, and promote the construction of a hierarchical medical system.[7]

3. Internet hospitals can save patients medical expenses

Tight medical resources have led to expensive and challenging access to medical care. Internet healthcare has the inherent advantage of eliminating waste caused by information asymmetry, unnecessary consumption caused by inconvenient travel, and extra expenses caused by repeated tests. When going to the hospital, registration is a problem, and the cost of transportation and time is not low. Especially for repeat patients, the consultation may take 5 minutes and the other time spent up to several hours. In addition, Internet medical care throughout health management, including prevention, treatment, follow-up, and rehabilitation. Especially in chronic diseases, smart wearable medical-grade devices can establish patient health records through the Internet medical platform and achieve self-health management in chronic disease monitoring, exercise monitoring and reminding, and diet management. This method has changed the information asymmetry problem in doctor-patient services and achieved savings in medical resources and overhead in potential aspects. In Shandong Province, Tai'an, China's first digital chronic disease management model with direct reimbursement by medical insurance at the municipal level, WeDoctor Group has achieved a 12.7% decrease in the average per prescription cost of patients with chronic diseases in local hospital outpatient clinics, a relative savings of more than 10% in public medical insurance payments, and a decrease of more than 5% in patients' burden in more than a year.[2]

4. AI-assisted diagnosis and treatment can increase the accuracy of di-

agnosis and treatment and improve the work efficiency of doctors

With the rapid development of artificial intelligence, big data, the Internet of Things, and other technologies, Internet hospitals are also benefiting from the industry changes brought by technology. Doctor consultation is a process of accumulating empiricism, searching, eliminating, and matching diseases. Experienced doctors need the accumulation of time and also the accumulation of workload. Artificial intelligence can often make up for the disadvantages of people in computing, storage, and other aspects. Built into the medical mapping, it can significantly improve the efficiency of doctors and improve the accuracy of treatment. For example, Ping An Good Doctor launched the "One Minute Consultation Room", where patients first communicate with the "AI Doctor" by voice, providing essential information such as medical complaints, and then the "AI Doctor" intelligent diagnosis to the specialist department. After the real doctor receives the consultation, the "AI Doctor" will assist the doctor in completing the whole process of health consultation and prescribing intelligent medicine, thus forming the intelligence of the whole consultation and improving the efficiency of the consultation. Medical-grade IoT devices also play a vital role in this process, including pulse diagnostic devices, intelligent blood pressure meters, and blood glucose meters, which provide remote data support for the doctor's consultation.

5. It can help primary hospitals to improve medical quality and train medical talents

From the history of China's medical development in Chapter 2, China's medical system is dominated by public hospitals, which include community health service centers, township health centers, clinics, infirmaries, and village health offices. Primary hospitals serve the majority of the general population. However, the medical equipment in primary hospitals is relatively backward, and the lack of medical talents and the ability to receive medical treatment is relatively low. Therefore, Internet hospitals can allow high-quality medical technology

and resources to sink to primary hospitals through medical associations and telemedicine collaboration. Internet hospitals provide the platform for the high-level hospitals to help them improve their receiving capacity and provide more convenient medical services for patients with minor, follow-up, and chronic diseases, ultimately achieving the purpose of a hierarchical diagnosis and treatment system. It is also possible to conduct medical teaching such as remote consultation or surgery through Internet hospitals. Especially the remote medical education system, an additional, more direct, and convenient learning opportunity for doctors in primary hospitals, can help train more medical talents at the primary institutions.

5.2 Weakness

In 2021, the National Telemedicine and Connected HealthCare Center released the "2021 China Internet Hospital Development Report". This report shows that less than 10% of China's Internet hospitals can achieve effective and sustainable operation, and most of them are in the zombie state of being built but not used or shallow.

1. Internet hospitals established mainly by traditional hospitals, balancing online and offline services has become the central conflict.

Data shows that of the 58 Internet hospitals in Hainan, only 38 have physicians registered, and only 9 have registered physicians with more than 100 people. Only 11 Internet hospitals carry out Internet medical treatment business. Three of them treat no more than 20 people. Only 7 of them have realized electronic prescription issuance, and 2 have no more than 20 electronic prescriptions.¹

Some medical institutions established Internet hospitals as a stopgap measure and did not really focus their efforts on Internet medical services. After the COVID, many medical institutions experienced a rapid decline in patient num-

¹Source: Data from Hainan Health Committee

bers and operational difficulties. They chose to open Internet hospitals to provide online medical services to retain patients. Internet medical services were put on the back burner as the epidemic was effectively controlled and offline medical services returned to normal. In addition, many hospital managers have become accustomed to the offline medical treatment model. Without national performance assessment or performance requirements, managers will focus more on offline, making it extremely difficult to change traditional medical treatment habits.

2. Patients do not trust and do not have the habit of using the Internet hospital

The biggest concern for traditional hospitals is whether patients are used to visiting doctors online. For patients, the trustworthiness of online consultation does not seem to be high. Especially for private hospitals, even Internet companies transformed to do the Internet hospital, the most challenging problems Internet hospitals face are patient trust and security issues. In addition, the credibility of online medical information is uneven, such as the occurrence of some "Putian system" hospital incidents. Doctors tried to treat a college student's cancer with untrustworthy immunotherapy in one Putian hospital, and the student later died. Putian hospitals were among the first to use the Internet model for advertising. The incident sparked nationwide outrage and protests in China, and the government stepped in to investigate Putian Hospital's advertising. Therefore, there is a big user trust issue and a lack of practices and guidelines for Internet hospitals, and patients are more accustomed to visiting the traditional tertiary hospitals.[5]

3. Internet hospitals have scarce specialist resources and limited practical physician resources.

Currently, physician resources are in short supply. According to the "White Paper on the Practice Status of Chinese Physicians" released by the Chinese Physicians Association, the average working hours of physicians are around 50

hours per week. Under the current tight offline doctor resources, the doctor resources that can provide effective online treatment are even more limited. Moreover, at present, expert resources are incredibly scarce. So, Internet hospitals will encounter the fundamental problem of insufficient resources. The shortage on the supply side means that it is a seller's market, whether for users or platforms. For patients, doctors have overloaded work, and the timeliness and accuracy of the online response to treatment are difficult to guarantee.

4. The problem of profitable business model

Many Internet hospitals are built more in response to the call to complete political tasks. According to statistics, most of the current Internet hospitals are not profitable. The data shows that the profit model of China's Internet hospitals is still immature, and most of them are loss-making. The main reason is that the industry has not found a mature and sustainable business model. Secondly, Internet hospitals need to continuously invest a lot of resources and capital costs, including the construction of technical platforms and the cost of doctors, especially experts. The current penetration rate of Internet medical consultation is less than 10%, and the penetration rate of treatment is less than 5%, so there is still much room for improvement in the future.² Therefore, the way forward is to find a sustainable and profitable business model and increase Internet medical consultation and treatment penetration rate through marketing strategies.

5. The supporting system of Internet medical services is not perfect, and the infrastructure of data sharing and interconnection still needs to be strengthened

Some supporting Internet medical service systems are not perfect, including technology, hardware, software, and the overall service system with offline hospitals. From the hardware point of view, common vital signs monitoring devices have been popularized. However, some specialized ones, such as portable

²Source: Data from 2021 China Internet Hospital Development Report

ultrasound devices and tongue meters, have not yet been popularized. In addition, there are significant differences in the performance of parameters such as network, storage, and mobile devices. So the observation of symptoms during the consultation process may lead to distortion and inaccuracy due to the differences in hardware, thus affecting the doctor's accurate diagnosis of the condition. Therefore, there is an urgent need to develop supporting clinical diagnostic portable devices, wearable devices, and auxiliary diagnostic devices related to medical services. The current level of information construction varies significantly from hospital to hospital at the software level. Especially in some primary hospitals, where the current information system construction is not mature enough, and some are too old to support the services required by Internet hospitals. Furthermore, due to many reasons, such as the ownership of medical data, transmission protocols, and data security, the current situation is that the infrastructure of data sharing and interconnection of Internet hospitals is still in the early stage of development.

5.3 Opportunity

1. Strong support from national policy

At present, the state intensively issued various support policies, including "Health China 2030" planning outline, "Internet Hospital Management Measures", "National Health Security Administration on improving the "Internet +" medical service prices and medical insurance payment policy guidance" and so on, aiming to develop Internet and intelligent medical industry vigorously. In China, nothing is more likely to succeed than national policy support. These policies are also driving the focus of the entire medical industry to health services, improving the quality and efficiency of overall medical services. Internet hospitals can help hospitals improve the overall quality and efficiency of services and improve the patient experience precisely by changing the mode of access to

healthcare. These policies are a rare and significant opportunity in the history of Internet hospital development.

2. The epidemic has changed the patient experience and accelerated the development of Internet hospitals

After the outbreak of the COVID, the Chinese government took strict preventive and control measures to ensure the resumption of work and production and stabilize the economy. As a result of the epidemic, 4% of hospitals nationwide closed their wards, 12% closed their outpatient clinics, and the number of outpatient visits decreased by more than 50%. The number of repeat patients decreased by 97%, and the time of repeat prescription was extended from 0.8 to 1.7 months.³ The stringent measures prompted people to embrace Internet treatment, which also accelerated the development of the Internet hospital market, with data from China's National Health Commission showing 20 times year-on-year increase in Internet treatment volume during the epidemic. In the post-epidemic period, all levels of government have supported online sales of prescription drugs. Internet hospitals' activities have been incorporated into national health insurance payments, vigorously building a complete closed-loop of Internet medical ecology from online consultation, online prescriptions, and online billing to drug delivery. The change in users' medical experience brings enough opportunities for the development of Internet hospitals, and quality service is the best way to retain customers.

3. Capital enters the Internet medical, promotes the development of the industry

In 2020, the Internet medical market size reached 196.1 billion. 2021 Internet medical market size increased 45% year-on-year to 283.1 billion. China's Internet giants Alibaba, Tencent, Baidu, Jingdong, and Ping An, have entered the Internet medical industry. In the first half of 2021, the Internet medical industry has 20 financing events, including Miaoshou Doctor financing 3 billion

³Source: Data from National Health Commission

yuan, We Doctor financing 400 million U.S. dollars, and Linkedcare financing 100 million U.S. dollars.⁴ The involvement of giants and significant capital will undoubtedly promote the rapid development of the overall industry and bring colossal development opportunities.

4. **Internet healthcare is full of considerable opportunities**

More than the factors below bring a vast and unlimited market demand for Internet healthcare in China and are full of substantial development opportunities.

- (a) The high support from national policies
- (b) The accelerated urbanization of China
- (c) The deepening of the aging population
- (d) The full liberalization of the maternity policy
- (e) The continuous growth of China's total GDP and per capita GDP
- (f) With the increase in the Chinese people's demand for quality of life
- (g) Advanced Technology in IoT, AI, cloud computing, 5G

5.4 Threat

1. **Internet hospitals are growing too fast, and there is no actual ability to operate effectively**

China's Internet hospitals are currently multiplying, with more than 1,600 and 500 new ones added in the first half of 2021 alone. Is there an actual market demand in the face of such growth, or is it simply an image project made for political achievements. According to the "2021 China Internet Hospital Development Report", most Internet hospitals are deserted and not used. Furthermore, less than 5% of hospitals achieve effective and sustainable operations. According to

⁴Source: Data from Thinking Finance

the data shown by the Health Care Commission of Hainan Province, 58 public hospitals in the province have built Internet hospitals, of which only 11 are carrying out Internet diagnosis and treatment business, and three of them have a diagnosis and treatment number of 20 people. Like the early development of the Internet, various companies like the rapid growth of the spring. After the bubble, lots of them died. Likewise, the Internet hospital has been spurting growth recently, with many entrants, but the quality of these Internet hospitals varies. Of these Internet hospitals, more than 70% are public hospitals, and public hospitals officially lack the means to market and operate effectively. In particular, the managers of public hospitals lack Internet operational thinking, and many public hospital directors are not familiar with the Internet. When the construction of Internet hospitals is to follow others, the follow-up does not have a long-term plan and effective operation.

2. The security of medical data

First of all, all hospitals are flocking to the Internet hospital. Whether the infrastructure is perfect is still an unknown. The ability to protect network security is yet to be tested. Internet hospitals launched in a short period are inevitably deficient in network security protection. Secondly, medical institutions have open access to the Internet, and medical data protection faces unprecedented challenges. Before the construction of the Internet hospital, the hospital's information system is usually deployed only in the hospital and not access to the Internet. Later, to facilitate patients' access to medical care and realize the functions of the real-time medical insurance settlement and remote access, a dedicated line approach or division of VPN was used to realize network outreach. In the Internet medical era, the hospital's information system is open to the Internet, medical and health information to online and offline interoperability, data integration closer, medical data is facing unprecedented security challenges. Once the data is maliciously damaged and the system service is interrupted, it will significantly impact. On the other hand, medical data

involves numerous personal health information, and Internet hospitals make patient information more centralized and accessible. The protection of personal privacy information also faces daunting challenges. For example, in 2018, the server of Hunan Children's Hospital was invaded by a ransomware virus, and all data files were forcibly encrypted, resulting in system paralysis.

3. Accident liability attribution

The attribution of liability for medical malpractice for Internet hospitals with traditional hospitals is easy to delineate. However, there are doubts about the attribution of responsibility for platform-based Internet hospitals. Is the registered doctor himself responsible, or the entity hospital behind the registered doctor, or the platform company of the Internet hospital. Although provinces and cities have issued corresponding regulations on liability determination, when the problem comes, it may lead to doctor-patient conflicts and even disputes. For example, the Chaoyang District Court in Beijing heard a case of an Internet hospital dispute. A patient consulted a remote consultation through a paid Internet app, and the doctor involved in the case advised him on matters such as his heart problem taking medication. However, half a month later, the patient's symptoms worsened, and he died the next day after unsuccessfully contacting the doctor through the app. During the trial of the case, there were many arguments about whether the remote consultation is the act of diagnosis or health consultation? Whether the Internet medical platform is responsible. Therefore, the attribution of responsibility after medical accidents is also a serious threat faced by Internet hospitals.

4. Legal and regulatory issues

The regulatory threat facing Internet hospitals is also very high. China firmly supports the development of Internet medical care, but the laws and regulations and regulatory environment are relatively lax. As the industry gradually matures and regulatory requirements become strict, the threats faced by Internet hospitals will gradually emerge. Such as network security and whether medical

data storage is in line with laws and regulations. The complete definition of the services provided by the Internet medical treatment and whether the treatment boundary aligns with national laws and regulations.

5.5 Conclusion

We need to take advantage of the Internet hospital through a SWOT analysis of China's Internet healthcare industry and seize the overall industry opportunities. Like taking advantage of the fact that Internet hospitals can solve the problems of uneven distribution of medical resources and imbalance between supply and demand, as well as help patients save money, improve the efficiency of doctors, and help grassroots hospitals improve medical quality and talent, and promote the construction of a hierarchical diagnosis and treatment system. In addition, we need to analyze and solve the core problems we encountered, such as balancing the development of online and offline hospitals, patients' trust and habits, shortage of expert resources, and failure to find a profitable business model. We also need to seize the opportunities given by the current national policies, capital support, and changes in patient habits to visit the hospital after COVID. Moreover, we have to break the Internet hospitals' bubble and actively face the challenges of medical data security, attribution of medical liability, and regulatory issues.

Chapter 6

Analysis of Current Internet Hospital Leaders in China and the U.S.

6.1 Telemedicine in the U.S.

The United States, which has the highest level of medical integration globally, has seen rapid growth in the telemedicine industry. Many large telemedicine companies have emerged, including Teladoc Health, Amwell, Grand Rounds, MORE Health, and others. The rise of telemedicine is because significant innovations are often born out of actual needs. In recent years, telemedicine has been the fastest growing industry almost worldwide. According to a report by Verified Market Research, the global telemedicine market will be worth \$72 billion by 2027. There are several reasons for the continued rapid growth of the telemedicine industry. First, as Internet technology matures and gradually penetrates from the consumer Internet to the industrial Internet. Second, the many problems of the current U.S. healthcare system have also brought about the growth of the telemedicine industry. Examples are the high cost of medical care, inefficient treatment process, poor emergency room experience, and long queues for medical treatment. According to the CDC, there are 1.25 billion outpatient visits in the U.S. each year, and about one-third of these visits can be resolved

through telemedicine. In addition, according to several U.S. associations, there are 5.1 million serious patient visits requiring telemedicine specialists each year. Moreover, the COVID has accelerated the popularity and use of telemedicine. Doctors, patients, and medical institutions are much more receptive to new ways of accessing care than before. Furthermore, insurance reimbursement rates for telemedicine have been increased to the same level as face-to-face visits. The FDA and CDC have issued policies to expand the application of telemedicine. These policies have also accelerated the acceptance of telemedicine by the American public.

6.1.1 Teladoc Health

In the U.S., Internet hospitals are primarily telemedicine. Teladoc Health is the earliest and largest telemedicine platform in the U.S., providing fully integrated medical care through video and telephone. The company was founded in 2002, and after nearly 20 years of development, it has become the most significant and oldest telemedicine service provider in the United States.[3] It focuses on primary care and telemedicine services for complex diseases and currently has a recent market capitalization of approximately \$23 billion. The company has five sub-brands, Teladoc, Advance Medical, Best Doctors, BetterHelp, and HealthiestYou. According to the earnings data, in 2021, Teladoc's full-year revenue is \$2.03 billion, an 86% increase from 2020.¹ There are currently a 54 million paying subscribers. From a business model perspective, Teladoc is primarily a subscription-based service where users pay a fixed monthly fee to receive treatment from a physician when needed. Teladoc is a model where the system assigns a physician, and the physician makes a callback, with a response time of approximately 10 minutes. Teladoc's primary customers are businesses, and its leading partner organization is a local hospital using local hospitals to provide Teladoc provides users with 24/7 access to telephone or online video services.

¹Source: Data from the annual report of Teladoc

After several funding rounds, Teladoc began acquiring similar telemedicine companies to acquire individual and SMB customers and further improve its business footprint. In 2013, Teladoc acquired ConsultADoctor to acquire individual and SMB customers and expand its service market. In 2014, Teladoc acquired AmeriDoc, a telemedicine company, to increase its market share and gain further access to SMB distribution channels. After going public in 2015, the company focused on its globalization strategy. 2018 saw the acquisition of Spanish telehealth services company Advance Medical, which allowed it to enter the Latin American and Asian markets. In 2019, they acquired Medecin Direct, a French telemedicine service company, and acquired more than 40 insurance partners from the other company, thus expanding into the European market. In order to expand the scope of services and areas, in 2017, Teladoc acquired Best Doctors to strengthen chronic disease telemedicine. In 2019, Teladoc led a Series C round of funding for Vida Health, expanding its presence in mental illness with the launch of Teladoc Medical Experts, a service for complex mental illness and physical health. InTouch Health, a scalable platform that supports care in any situation and for any use case, works with 450 hospitals and healthcare organizations worldwide and has more than 14,500 physician users. At the end of the same year, Teladoc completed the acquisition of Livongo Health, another publicly-traded company, for \$18.5 billion, a platform focused on chronic diseases such as diabetes and heart disease. Teladoc is now the only global telemedicine company covering all areas of care, with a wide range of services from critical care and chronic disease to daily care, covering a variety of scenarios from home, pharmacy, retail, doctor's office, and ambulance.²

6.1.2 Amwell

Amwell started with chronic disease management as an entry point, providing remote consultation between patients and doctors via video. Later, they gradually established an online consultation platform to provide online consultation services to users while

²Source: Data from annual report of Teladoc

solving many telemedicine problems of medical institutions, such as HIPAA compliance. The company launched Teleded Tablet in 2015, which allows direct access to available specialists within the hospital system and consequently establishes a connection to help doctors conduct consultations via video link. American Well platform can be fully embedded into their clients' patient or member portals and provider workflows. Providers can launch telehealth directly from their native Electronic Health Records ("EHRs"), with seamless integration to their payer eligibility and claims systems. Providers, patients, and members can access this care through a full range of Carepoints, including via mobile, web, phone, and their proprietary kiosks and carts that support multi-way video, phone, or secure messaging interactions. Amwell has also contracted with several well-known medical institutions, such as Mayo, to promote the O2O model.

Amwell charges a visit fee of \$49 per visit or \$39 if the company has a partnership from a business model perspective. At the same time, Amwell allows users to choose their department and then select an available doctor, with an average wait time of 2.2 minutes. Amwell's customers are individuals and businesses, and partner organizations. In addition to local hospitals, their companies contract many doctors to perform consultation services.

According to the strategic cooperation agreement, Google will provide a data cloud platform and remote video system for Amwell telemedicine service and home chronic disease management. In terms of Internet video technology, Google Cloud will solve a seemingly simple but the core problem that has hindered the expansion of telemedicine services. Whenever customers use telemedicine services or mobile apps, they must download them to their computer endpoints or cell phones, which makes many people hesitant or unsure of what to do. The future of the telehealth services platform can be "click and go" without downloading small programs or video software systems. Google Cloud will purchase \$100 million of the company's Class C stock in a private placement. In addition, Amwell's hiring of hospital directors and former high-ranking government officials will also give it a fair chance to leverage its social connections

and technical expertise. In IPO business reporting documents, former Massachusetts Governor Deval Patrick and Massachusetts General Hospital President Dr. Peter Slavin serve as directors of the company, each holding 352,000 Class A stock options. Amwell's business reports show that their customers provide telehealth services to clients at all levels of the hospital system, health insurance agencies, and federal and state public health systems. Furthermore, their telehealth sites in primary communities and remote areas are Amwell's strength and specialty. The telemedicine platform currently supports approximately 62,000 healthcare providers, including over 2,000 hospitals.³

6.1.3 Doctor on Demand

Founded in 2012, Doctor on Demand focuses on employee physical and mental health services by providing them to companies. The solution addresses the efficiency and experience of healthcare services in the United States. The problem of undersupply of healthcare services in the U.S. is currently growing. The average wait time for a patient to successfully make an appointment with a surgeon is three weeks. In contrast, the average wait time for a successful appointment with a psychiatrist or psychologist is 25 days. Meanwhile, patients are also spending at least four to six hours on transportation links. The high cost of time causes close to half of the patients with mental health problems to abandon appropriate seeking treatment. Doctor on Demand is the medical version of Uber, which matches patients and doctors through an app that enables video consultations by asking the patient and taking the order. Doctor on Demand has its doctor platform, allowing doctors with professional licenses to enter the platform and be vetted to start their practice. Users describe their problems on the app, and Doctor on Demand sends them to all doctors. If a doctor responds, the patient can have a video consultation with the doctor and an assisted consultation through text and pictures, with an average waiting time of 90 seconds. However, there is no further contact between the doctor and the patient

³Source: Amwell annual report 2011

after completing the consultation. The working hours are limited to 7:00 am to 11:00 pm, and the fee model is to pay for a single visit, usually 40or50 per visit, and the doctor gets paid 30–40. For severe injuries and emergencies, Doctor On Demand advises users to seek emergency care through conventional medical channels to avoid irreparable damage due to the deterioration of acute conditions.

Doctor on Demand has some unique competitive advantages.

1. **Ensuring optimal quality of healthcare**

To ensure the quality of medical consultations, Doctor On Demand conducts rigorous screening and evaluation of physicians who apply to join its network and those who have already joined. Doctors are screened and interviewed in multiple rounds. Only one of the 10 to 20 doctors who apply will be interviewed. Doctor On Demand evaluates the doctors who have joined its network through a two-pronged daily management process. Patients can rate their doctors on timeliness, effectiveness, and communication flow at the end of the consultation. In contrast, Doctor On Demand archives the entire consultation and randomly and anonymously assign video files to other doctors for equally anonymous peer review, examining the doctor’s timeliness, professionalism, objectivity, and percentage of prescriptions. The video files are randomly and anonymously assigned to other physicians for similarly anonymous peer review, examining timeliness, professionalism, objectivity, and percentage of prescriptions that physicians resolve. For mental health, Doctor On Demand requires psychologists to have a doctorate in psychology and requires that psychologists be psychotherapists, not counselors. Doctor On Demand assesses its psychologists for cultural competency and sensitivity to ethnicity, religion, and gender. For lactation consultants, Doctor On Demand requires that consultants be certified by the International Board of Certified Professional Lactation Consultants and have sufficient knowledge and experience in obstetrics. Strict and uninterrupted quality control effectively ensures the overall quality of Doctor On Demand’s medical services. It is a significant guarantee of Doctor On Demand’s

survival in the fierce competition of Internet healthcare.

2. Innovative business model

By building a digital Internet platform, Doctor On Demand provides a new medium of online medical services for patients and doctors, similar to uber. They realized fast and accurate docking between doctors and patients and efficient utilization of medical resources, satisfying to a certain extent the pain point of saving corresponding time costs for users and introducing a brand new idea for the overall business model of the industry.

3. Focus on special market segments

Doctor On Demand classifies health issues into four categories: adult medical, pediatric medical, lactation consultant, and mental health. Moreover, mental health is divided into psychological and psychiatric categories depending on the severity of the patient's mental health issues. Mental health counseling and treatment are the features of Doctor on Demand's entry into the telemedicine market, and it focuses on this area. It is a testament to Doctor On Demand's focus in this area that the company's label and business cards have penetrated the consumer psyche. Therefore, Doctor On Demand's strategy of developing its marketing strategy from a specialty area to a generalist one is worth learning.

6.2 Internet hospital in China

In China, the initiators of Internet hospitals include public hospitals, private hospitals, regional health care committees, medical insurance bureaus, Internet companies, pharmaceutical companies, insurance companies, and other different institutions. With the implementation of the management approach in 2018, public hospitals are becoming the leading force in the construction of Internet hospitals, accounting for nearly 70%. As the National Telemedicine and Connected HealthCare Center, China-Japan Friendship Hospital is the current model of an Internet hospital. Ping An Good

Doctor, is currently the most prominent Internet hospital platform, mainly for technology companies. The status of Internet hospital is developing very fast. The current online treatment of Internet hospitals is achieving leapfrog growth in 2020, especially the entity medical institutions build Internet hospitals. The outbreak of COVID has blocked the offline treatment pathway. Many patients, especially those with joint and chronic diseases, have started communicating with doctors and diagnosing diseases online. Patients have recognized the speed and high efficiency of online treatment for this new way of treatment, which has continuously changed their treatment habits.

6.2.1 Ping An Good Doctor

Ping An Good Doctor is the Internet medical and health service platform of Ping An Group and is committed to building a professional doctor-patient communication bridge. Moreover, it is currently the most prominent, leading model, and most solid competitive Internet medical platform in China. Ping An Good Doctor has formed vital business segments such as online medical, consumer medical, health mall, health management, and interaction.

Since April 2015, when Ping An Good Doctor app was launched, by the end of 2021, the cumulative number of registered users reached 420 million, the cumulative number of consultations reached 1.27 billion, and the total revenue reached 7.334 billion yuan. According to the 2021 annual Report. Ping An Good Doctor's business is mainly oriented to the customer side. It forms a three-tier doctor network covering the whole country by building its own doctor team, contracting doctors from nationally renowned tertiary hospitals and nationally renowned medical experts. At the same time, Ping An Good Doctor also builds a ground medicine network by applying for a medicine B2C license and cooperating with offline pharmacies to provide users with medicine O2O services. Moreover, Ping An Good Doctor builds a "health cloud" platform to collect users' medical records, online consultation information, medical

checkups, and other information to establish users' electronic health files.⁴

Ping An Good Doctor's business model is as a platform company. It continuously acquires users from four channels: individual users (patients), insurance customers (policy users), corporate customers (corporate employees), and Internet hospitals (self-built or co-built with offline hospitals), and realizes them through its services and products. Online medical mainly provides online consultation and treatment for corporate customers, online medical for individual customers, and health membership programs. Consumer healthcare mainly provides medical service packages for customers, including medical checkups, medical aesthetics, genetic testing, online consultation, and other services. Health Mall is mainly divided into self-operated and platform models, selling product categories including medical and health products and fitness products. Health management is mainly through advertising to obtain marketing and promotion fees from the brand side.

In 2021, Ping An Good Doctor also underwent a strategic upgrade. Thanks to the unique market advantage of relying on Ping An Group's insurance organization and following the strategic approach that has been proven to be effective by international giants, Ping An Good Doctor is launching the Health Maintenance Organization (HMO) model in 2021. HMO insurance plans are relatively inexpensive, and patients pay a lower percentage of out-of-pocket costs after visiting the doctor. The goal of an HMO is to provide health management for each member, emphasizing improving the overall health of the insured through preventive and comprehensive coordination of care, thereby reducing medical costs. This model is simply a combination of medical services and health insurance. Users pay a fee to an insurance agency and then receive services from medical institutions that partner with the corresponding insurance agency. After this strategic upgrade, Ping An Good Doctor will run the new business model of "HMO health management + family doctor membership + O2O medical services". From Ping An Good Doctor's specific strategic plan, the essence is to build the core hub of "family doctor" to cover different major service management scenar-

⁴Source: Data from annual report 2021

ios, such as health management, disease management, chronic disease management, and elderly management. Moreover, it runs through the members' online consultation, offline resource matching, treatment accompaniment, and the whole process of rehabilitation. It is worth mentioning that the "family doctor" here is not just playing the role of online consultation but can help users from the whole process before and during the consultation so that users can find the right medical services in a more time-saving and effortless way. Therefore, the combination of online and offline is also an inevitable choice for implementing the new strategy, and this is precisely the concentration of the advantages of Ping An Good Doctor. Ping An Good Doctor has enormous offline medical resources, providing users with convenient medical services to the maximum extent. As of September 30, 2021, Ping An Good Doctor has cooperated with more than 4,000 hospitals, 189,000 pharmacies, 1,800 fitness organizations, about 1,700 medical checkups, and about 83,000 medical and health institutions.⁵

Although the data looks excellent, Ping An Good Doctor also faces many problems.

1. Copy the Internet model with poor profitability

In 2020, almost every industry was hit by the epidemic, but there is a real exception for Internet healthcare. The epidemic triggered an unprecedented focus on health, while travel restrictions forced people to turn to online healthcare. Against this backdrop, Ping An Good Doctor's operating income jumped 35.5% to 6.866 billion yuan in 2020. However, the net loss was 948 million yuan, a further expansion of 29.25% from 2019. If we exclude the impact of exchange rate fluctuations and employee options, the adjusted net loss was 516 million yuan, a 25.8% loss reduction from 2019. This data is the sixth loss-making year for Ping An Good Doctor, with a combined loss of nearly 4.7 billion yuan. 2021, after a significant turnover at the company's top management team, saw corporate revenue of 7.334 billion yuan, up 6.8% year-on-year, and an annual net operating loss of 1.539 billion yuan, expanding 62% year-on-year. Ping An Good Doctor also lost money for seven consecutive years. Looking closely at

⁵Source: Data from annual report 2021

Ping An Good Doctor's operational measures, it is easy to see that the Internet traffic model is severe. Through free consultation and cash subsidies for high traffic, the current primary profit model is for medical e-commerce to attract traffic and thus promote user conversion. After an in-depth analysis of its current business model, we are pessimistic about the future development of Ping An Good Doctor. Ping An Good Doctor may have fallen into a traffic trap wrapped up in the capital. In terms of revenue size, average daily consultation volume, and other data, Ping An Good Doctor is also far ahead. Ping An Good Doctor monopolizes the vast majority of traffic in the Internet medical field from the data alone. From the valuation point of view, the capital market has a very high degree of trust and is the absolute Internet medical industry leader. After an in-depth experience of Ping An Good Doctor's product, we find that Ping An Good Doctor's high user activity comes from high subsidies. From the product framework design of Ping An Good Doctor, it is easy to find that the core traffic entrance of Ping An Good Doctor comes from the "step by step gold" user subsidy activity. Through sign-ups, daily lucky draws, cell phone step counting, invitations to register, and order sharing, users are subsidized in the form of "health gold". By accumulating health gold, users can redeem free products on the platform or redeem certain benefits in the mall. Ping An Good Doctor's subsidies hurt the user experience of the product. From the perspective of product page design, the entrance of the subsidized activities occupies the space of the medical business page and steals a lot of users' attention, which will inevitably cause the user experience of the online consultation function to decline.

2. The threat of technology giants

Ali health app, more famous Doctor Deer, focuses on the online diagnosis and treatment business. And JD Health has been completing multiple rounds of financing since 2019 to go public in Hong Kong. With its colossal traffic advantage and capital advantage, suppose Ping An Good Doctor can maintain its

dominant position in the current competitive environment at the expense of user experience. Then when faced with the decisive entry of the two giants Ali and JD, Ping An Good Doctor's competitive advantage over its current competitors no longer exists. The two e-commerce giants, Ali and JD, inherently have a substantial natural traffic base and can effectively channel traffic to their health products. From the point of view of product experience design, both Doctor Deer and JD Health are more experienced in the development of APP. From the perspective of product framework, interaction design, or visual design, Doctor Deer and JD Health are better than Ping An Good Doctor. From the deployment of the supply and demand side, the e-commerce giants have significant competitive advantages in both supply chain and logistics. In contrast, Ping An Good Doctor currently has a weak layout of the entire industry chain in the e-commerce business and is not competitive enough overall. Therefore, in the case of the low competitiveness of the e-commerce business, it is crucial to strengthen the existing advantages of its own online consultation business and return to the essence of medical treatment.

6.2.2 China-Japan Friendship Hospital

China-Japan Friendship Hospital is a representative of the Internet hospital based on a physical hospital and a public hospital based on the "National Telemedicine and Connected HealthCare Center", "National Health and Health Commission Telemedicine Management and Training Center" and "National Health and Health Commission Primary Telemedicine Development Guidance Center". On April 6, 2021, China-Japan Friendship Hospital officially obtained the license to practice under the second name of "China-Japan Friendship Hospital Internet Hospital". The hospital has jointly developed a co-build platform and operation and maintenance management with a third-party company in response to the State Council's call to encourage a third-party co-build mechanism. The platform opened it to all medical institutions and operating companies to explore establishing a diversified long-term operation system.

The China-Japan Friendship Hospital Internet Hospital provides pre-consultation, joint outpatient consultation, online follow-up consultation, telemedicine, two-way referral, pharmacy guidance, and medication home delivery. First-time patients can apply for the joint outpatient clinic at the local hospital. Experts and local physicians work together. Follow-up patients can receive continuous medical care such as chronic disease management and rehabilitation guidance online. Furthermore, they will gradually open home hospital beds, home visits, and online nursing care services to provide medical care for the chronically ill who age at home and in the grassroots community.⁶

During the Internet hospital construction, The China-Japan Friendship Hospital Internet Hospital has some highlights and features.

- 1. Innovate the process of re-consultation and achieve drug distribution at home**

The same department doctor conducts online follow-up consultations based on the complete medical history and online consultation capability. It realizes online follow-up consultation and delivery of medicine to home, solving patients' needs for prescribing medicine for chronic diseases and enhancing the physical hospital's medical environment while releasing the hospital's most valuable expert resources.

- 2. Remote joint clinic construction to realize the sinking of high-quality medical resources**

Through the construction of the telemedicine system, when the primary hospital is unable to make a precise diagnosis of more complex outpatient cases, doctors at the lower level can initiate a remote outpatient application to the higher-level hospital. Based on real-time communication and data interoperability, patients can enjoy high-level outpatient services at the local hospital after the higher-level hospital gives treatment recommendations. This online care enables the

⁶Source: Interview of the Director of National Telemedicine and Connected HealthCare Center

sinking of specialist resources and the forward movement of outpatient services within the medical association, keeping patients at the grassroots level.

3. Combining chronic disease prevention and critical care

The tremendous significance of online follow-up consultation in Internet hospitals is the continuous management of chronic diseases through the Internet platform and the effective prevention of significant complications. However, remote consultation can guide the local hospital to carry out assistance once a patient has a complex primary disease. Therefore, the Internet hospital is an integrated platform that provides solutions for different patients' comprehensive needs and provides a comprehensive platform for the whole society to seek medical treatment.

4. Medical collaboration combined with capacity building of primary care physicians

The China-Japan Friendship Hospital addresses the needs of grassroots patients seeking medical treatment and helps grassroots physicians improve their ability to receive and standardize their treatment. The hospital combines physician training with clinical case teaching through remote training, visits, and case discussions. On the one hand, the hospital improves primary care physicians' standardized diagnosis and treatment ability. On the other hand, the hospital improves the collaborative treatment ability among specialist physicians.

5. Improve the efficiency of health care and provide more benefit to the people

With the construction of the National Telemedicine Collaborative System for Aging Health Care, the hospital provides a collaborative system for patients from primary care to central medical assistance, reducing the worries of the elderly's children.

However, the China-Japan Friendship Hospital Internet hospital also encountered very representative problems.

1. The low price of online treatment leads to losses and insufficient incentive for expert doctors to participate

In March 2020, in conjunction with the National Health Insurance Bureau, the National Health Commission issued a document to include the cost of Internet medical services in the scope of health insurance payments and to reimburse patients online for Internet follow-up services for common and chronic diseases. According to the regulations, Beijing's regulations are 50 yuan per visit for online consultations with specialists and general practitioners, which is only half of the cost of offline specialist medical services but is the highest level in the country. The main reason is that after the inclusion of Internet medical care into medical insurance, the medical insurance bureau is worried about the price liberalization and the increase in payment burden. However, the price is set too low, and doctors have no incentive to participate. Considering the cost, with the customization program of large tertiary hospitals, the investment in hardware and software alone is more than a few million yuan. It can even reach the level of more than 50 million yuan. Such pricing can hardly cover the cost of investment in public hospitals. Therefore, it is unsustainable to establish an Internet hospital solely based on public interest or policy-driven.

2. Technical shortcomings and limited medical scenarios make it difficult to market at scale

At present, the Internet hospital platform of public hospitals is undeniable technical shortcomings compared with private Internet hospitals such as Ali Health, JD Health, Ping An Good Doctor. Whether from server resistance, security, data interoperability, video and image transmission stability, or product ease of use, intelligence, the technical capability of public hospitals is weak. In addition, big data, artificial intelligence, and other cutting-edge technologies are limited by the level of basic information technology in public hospitals, making public hospitals' Internet hospitals themselves not competitive. In particular, the main business of public Internet hospitals is still formal consultation and data

management, which is only an extension of offline business. Furthermore, registration is an essential part of Internet medical services. Even if the national Internet hospital platform like China-Japan Friendship Hospital, 60% of the current business click from the registration business. The average daily online consultation volume of 55 cases requires the input of 31.5 departments and 320 doctors. Such input and output efficiency are meager. Therefore, strengthening the technical development of Internet medical care and enriching more medical scenarios is an urgent problem to be solved by Internet hospitals, mainly in public hospitals in the future.

3. Inadequate management and operation capabilities

Operators of Internet hospitals need to know what doctors want and what patients need and policies and Internet-related technologies. Lu Qingjun, director of the information department of China-Japan Friendship Hospital and director of National Telemedicine and Connected HealthCare Center, also mentioned in the interview that there are only four people with full-time responsibility for the Internet hospital at China-Japan Friendship Hospital, while the number of the ideal operation team should be more than 20 people. For the ability and loyalty of the team members, Lu Qingjun also said that it is tough to recruit talents with excellent management and operation of the Internet hospital due to the limitations of the salary level. In exploring the Internet hospital, the talents need not pursue money. Furthermore, such talent is rare in the market economy, and it is not easy to cultivate in the future. Without operational talent, there is no traffic and no healthy business model, which also explains the small number of online consultations per day on the best Internet hospital platform in the country at present.

6.3 Conclusion

Analyzing the leading Internet hospitals in China and the U.S. makes it easy to see that U.S. telemedicine companies are more focused and vertical. In contrast, Chinese Internet hospitals are more platform-oriented. Some of these companies have unique strategies and products worth learning from, such as Amwell's telemedicine platform for hospitals, primarily targeted at healthcare organizations. Another example is Teladoc's acquisition of a French telemedicine company to gain more than 40 insurance partners, demonstrating the importance of insurance agencies in healthcare activities. Ping An Good Doctor's online mall also attracts medical device and equipment manufacturers to the entire ecosystem of medical activities. These unique strategies and offerings have lessons to learn and learn from in exploring better business models. Nevertheless, all the companies analyzed have businesses that are primarily products built around patients. So the Internet hospital model built around medical institutions and medical staff is not explored and practiced and shows great potential and space.

Chapter 7

Explore the Business Model for Internet Hospitals

The Internet has had a considerable impact and transformation on all walks of life. In the Internet medical industry, from diagnosis to treatment, from surgery to drug administration, monitoring to follow-up will enter the era of information technology and intelligence. Furthermore, the industry progress and model change will inevitably bring benefits and pain. A successful business model must meet as many demands of relevant participants and solve as many stakeholders' pain points as possible to achieve a multi-win situation. Therefore, the business model of Internet hospitals must take into account and achieve a multi-win business profit model for patients, hospitals, pharmaceutical companies, insurance, and other parties.

7.1 The analysis of stakeholders in healthcare activities

7.1.1 Chinese Government

The Chinese government focuses on whether medical institutions meet the people's medical needs. In defining the current major social contradictions, the government has repeatedly mentioned that as Chinese society develops and progresses, the Chinese people's aspiration for a better life has become more robust. The people expect better education, more stable jobs, more satisfying income, more reliable social security, and a higher level of medical and health services. It also pointed out that the current volume of medical construction is not sufficient. At present, the people "difficult and expensive to see a doctor" phenomenon still exists. The number of large public hospitals is slight, and many patients have to go to the provincial cities or even to Beijing for medical treatment. The fundamental reason is that the volume of medical institutions is not sufficient to meet the needs of more than 1.4 billion Chinese people to see a doctor.

China's national health insurance also belongs to the government. By the end of 2021, the number of people insured by basic medical insurance was 136 million, covering more than 95% of the population. In 2021, the total income of the primary medical insurance fund was 2,871 billion yuan, and the total expenditure was 2,401 billion yuan.¹ Under the premise of providing basic medical insurance for the whole country, the government's interest statement is also to use medical insurance wisely.

Therefore, from the Chinese government's policy, the most critical claim is to protect the 1.4 billion Chinese people's demand for medical treatment and achieve a faster, more efficient, and satisfactory medical experience for the general public. The most significant interest is the rational use of medical insurance while providing basic

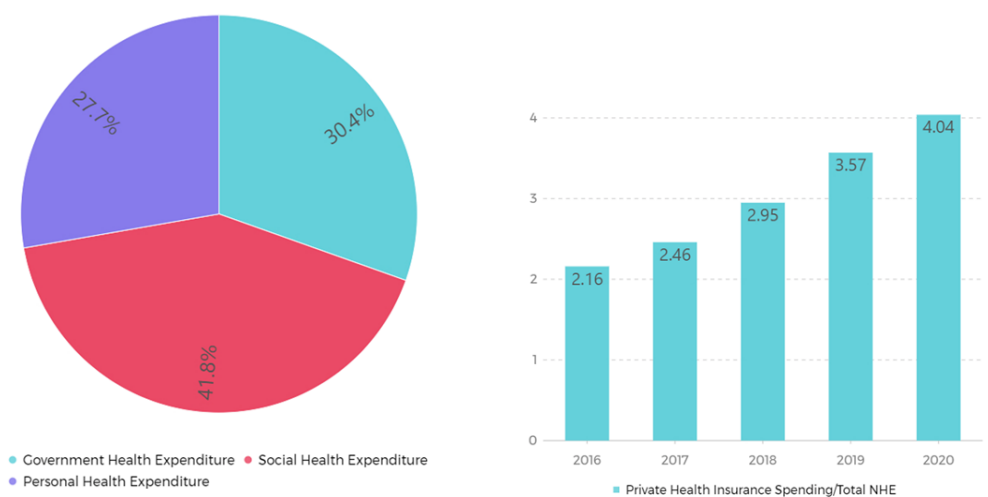
¹Source: Data from China Banking and Insurance Regulatory Commission

medical coverage for the entire population.

7.1.2 Insurance Company

The insurance company here refers to the commercial insurance company except for the national basic medical insurance. According to the "Statistical Bulletin of China's Health and Health Development in 2020", published by China's Department of Planning, Development, and Informatization on July 13, 2021, the total annual health expenditure in 2020 was 7,230.64 billion yuan, of which personal health expenditure was 2,005.53 billion yuan accounting for 27.7%. In other words, the Chinese people still pay a high percentage of out-of-pocket expenses for medical care. According to the CBRC, China's annual health insurance original premium income in 2020 was 817.3 billion compared to 706.6 billion in 2019, an increase of 110.7 billion, or 15.67% year-on-year. 2020 health insurance payout expenditure was 292.1 billion compared to 235.1 billion in 2019, increasing 24.25% year-on-year. However, the total payout figure for 2020 is only 4.04% of China's annual health expenditure, a slight increase compared to 3.57% in 2019. Figure 7-1 has two sub figures, fig. 7-1(a) is the composition ratio of health expenditures and fig. 7-1(b) is the private health insurance spending ratio.² According to the Figure 7-1, the proportion of commercial health insurance claims to total health spending in China has increased year by year in recent years. 2020 U.S. National Health Expenditure (NHE) is 4.1 trillion dollars, and private insurance spending is 1.15 trillion-dollar which is a 28% percent share of NHE. Data shows that the U.S. has a much higher payout ratio in commercial insurance companies than China. Therefore, there is a vast potential market for commercial health insurance in China.

²Source: Data from The China Banking Regulatory Commission (CBRC)



(a) Composition of Health Expenditures (b) Private Health Insurance Spending Ratio

Figure 7-1: Health Expenditure in China

After analyzing the fact that China's current health insurance premium revenues and claims ratios are far less than developed countries, the main reasons for this are the difficulty in marketing and sales acquisition, high underwriting and claims risk, and the disconnect between insurance and service.

1. The main reason for the difficulty in customer acquisition is that health insurance relies on agent sales, but the retention rate of agents is low, and consumer trust is insufficient. Secondly, the agent commission is high, and the sales expense is considerable.
2. The high risk of underwriting claims is mainly due to underwriting claims relying on experience and the high risk of missed claims. Secondly, the efficiency of underwriting claims for significant cases is low, claims processing is cumbersome, and the risk of customer complaints is high.
3. The disconnection between insurance and service is manifested in the weak awareness of health management among customers and the poor linkage between insurance and health management. The second is the lack of connection between

insurance companies and hospitals and the difficulty of medical cost control.

Therefore, the core interests of insurance companies are how to obtain customer flow, reduce customer acquisition costs, accelerate underwriting and claims processing efficiency, control claims risk, cultivate customer health management awareness, and strengthen the connection with hospitals to achieve control of medical costs.

7.1.3 Pharmaceutical Company

As the second-largest drug market globally, China started to promote the "4+7" quantity procurement policy in the second half of 2018. The overall logic of the drug commercial and even industrial market continues to undergo a significant shift. For Chinese manufacturers, the trend will be to choose to be acquired or actively withdraw from the market in the future. As many generic drugs are reduced in price or even eliminated, the number and structure of Chinese pharmaceutical industrial enterprises will also be like the U.S. market. Moreover, with the pressure on health insurance funds increasing, the growth rate of China's pharmaceutical market is gradually slowing down after reaching a short-term peak. The days of drug companies relying on the dividends of health insurance funds are gone. The first reason for this is that in the past, when the access environment was lagging, multinational pharmaceutical companies enjoyed long-term "super-national treatment" in China, and the prices of generic drugs remained high for a long time. In the past, the overall proportion of generic drugs in the Chinese market was more than 80% or even higher, and the proportion of sales of generic drugs by multinational pharmaceutical companies reached 80%. To Pfizer,³ for example, Lipitor, which was listed in China in 2000, has long passed the patent period. However, the sales in China in 2018 are still as high as 10 billion, more than one-third of Pfizer's sales in China, a phenomenon that is unimaginable in the European and American markets.

³Source: Strategic Response of Multinational Pharmaceutical Companies in the Context of China's Pharmaceutical Reform Report by Ernst & Young

Therefore, the current survival environment of Chinese and multinational pharmaceutical companies in China has changed dramatically compared to before 2018, and the survival space is hugely compressed. Pharmaceutical companies have to adapt to the Chinese government's policies through a rapid transformation. In addition to the rapid entry of the original drugs that have passed the patent period into cost competition and the establishment of R&D headquarters in China or cooperation with local companies, marketing efficiency needs to be significantly improved. In the context of government cost control, the bargaining space of pharmaceutical companies will be compressed, and they will eventually adopt "price for market", which will require improving the company's marketing efficiency and reducing internal operating costs. All in all, the main interest of pharmaceutical companies is in the procurement volume and fixed efficient marketing channels.

7.1.4 Medical Device Manufacturer

Wearable medical devices are electronic devices that can be worn directly on the body and have medical functions such as sign monitoring, disease treatment, or drug administration. As China's aging problem becomes more and more serious, the demand for healthcare for the elderly increases dramatically. In addition, the large group of patients with chronic diseases creates market opportunities for wearable medical devices. According to statistics, the market size of wearable medical devices in China has grown from 1.2 billion yuan in 2015 to 12.2 billion yuan in 2020, showing strong growth, and the value will exceed 20 billion yuan by 2023.⁴

Both technology giants and traditional medical device companies have a deeper layout in wearable medical devices. Medtronic's wearable medical device "Guardian Connect" is launched in China by 2020. The size of Medtronic's wearable medical device "Guardian Connect" is only equivalent to the size of a shell. Through the microsensor implanted in the abdomen or upper arm, the system automatically records the

⁴Source: Data from market research agency's forecast

glucose value every 5 minutes. A total of 288 glucose values are recorded in 24 hours, and then the algorithm carried by the built-in chip analyzes these data in real-time and can predict the risk of high and low blood sugar in the next 60 minutes. In 2018, Apple's AppleWatch Series4 introduced the ECG detection function, received FDA approval, and got CFDA approval in China in June and August 2021. In August 2021, Huawei's wrist ECG and blood pressure recorder, ECG analysis system, heart rate irregularity analysis system, and wrist single-lead ECG collector entered the priority approval process, which will further enrich the monitoring function of its smart medical watch. In addition to Apple and Huawei, companies including Garmin, Google, Sony, Xiaomi, and Samsung are currently competing fiercely in wearable medical devices.

Of course, medical device manufacturers are essential for the ecology of the whole industry through the continuous investment and layout of medical-level wearable devices. For the manufacturers, their most fundamental interest is expanding the market, having more sales, and bringing sustainable business development. Although consumer-level wearable devices are booming, medical-level wearable devices have more room for development. The use scenario of medical-level wearable devices is still relatively single. Although the IoT can interconnect these wearable devices well from the technical level, more rich scenarios need to be explored.

7.1.5 Traditional Hospital

The core strategic goal of the hospital is to maximize patient and physician value. In short, it is to achieve the best treatment results at the lowest cost. The biggest problem plaguing tertiary hospitals is the waste of scarce quality resources. Many tertiary hospitals are occupied by some minor diseases or even non-disease needs, while the actual medical needs of severe diseases and significant diseases are often challenging to get timely and effective treatment. This phenomenon is ultimately caused by the uneven distribution of geography and resources of hospital medical

services. On the one hand, patients do not have access to excellent medical services. On the other hand, it also hinders the development of general tertiary hospitals.

From the perspective of the fundamental interests of traditional hospitals, public hospitals have entered the cost era, and the development strategy of outreach expansion has come to an end. Medical costs increase year by year, and it is not easy to control costs. In the context of medical cost control, especially the promotion of DRGs application, public hospitals' revenue sources and income distribution model have changed, patient resources may be redivided, and the interest pattern will be reshuffled. The model of relying on the excessive expansion of scale, the number of patients admitted, and thin profit to expand revenue cannot last forever. As a non-profit government organization, the fundamental interests of patients are also an essential consideration for hospitals, and patients' access to medical care is expensive and complicated. The conflict between doctors and patients is challenging to reconcile.

Therefore, the most significant consideration for traditional public hospitals is making full use of the transformation opportunity of Internet hospitals in the current social context and innovatively reforming the cost, efficiency, and operating model to maximize the value of medical services.

7.1.6 Internet Hospital

A very detailed analysis of the Internet medical industry and Internet hospitals has been done in the previous chapters. To sum up, Internet hospitals currently need to achieve more coverage of medical access scenarios to ensure the safety of medical data. Moreover, we need to abandon the implementation of the policy call without thought. Find a sustainable operating model that meets their needs as soon as possible.

7.1.7 Doctor

More work, less money, and high risk are a microcosm of the current situation of Chinese healthcare workers. Doctors in China's hospitals work more than 50 hours a week, 62% of physicians have had medical disputes of varying degrees, 33.2% of surveyed physicians suffer from more than one disease, and the annual per capita income of physicians with senior titles is just over 100,000 yuan.⁵ These figures reflect the high cost, high risk, and high work intensity of the Chinese medical and nursing community. Coupled with the pressure for promotion and the doctor-patient relationship, many doctors and nurses are in long-term anxiety.

Xiao Deming, former president of Peking University Shenzhen Hospital, mentioned in the interview that the work of Chinese doctors is mainly focused on medical, teaching, and research. The work that takes up the most time in most doctors' jobs is surgery. He explained that there would be a system of work in Chinese hospitals for doctors. For example, in the case of surgery, a department will usually have two days of surgery days. Since many departments require surgery, dozens or even hundreds of surgeries per day in China's tertiary hospitals, surgery days are designed to rationalize the allocation of operating room use, given the limited number of operating rooms available. Therefore, each department or doctor has its exclusive surgery day. On surgery days, it is usually done from 8 a.m. until all surgeries are finished. The surgeon is working hard and needs to fight continuously on this day. They may need to continuously do more than ten hours of surgery, which requires high concentration and excellent physical strength. This works out to about 35% of the surgeon's time, usually taken up by surgery and related work.

Secondly, ward-related tasks include room visits, reading patient data, including test results, images, etc., writing medical records, issuing medical orders, and handing over shifts. These clinically related tasks also consume a lot of the doctor's time, especially the time spent on writing the medical record. The medical record is the most critical

⁵Source: Data from the White Paper on the State of Physician Practice in China

document. In addition to the patient's treatment process, there are various informed consent forms, pre-operative discussions, some documents with condition analysis, surgical logs, and other documents that record the surgical process. The medical record can record the whole process of severe medical treatment and have the approval of superior doctors to form better clinical thinking. Moreover, it is also an essential clinical accumulation for future research. These tasks usually occupy 30% of a doctor's time.

Outpatient practice is also an essential part of a doctor's job, usually only 1-2 days a week. Only doctors with specific qualifications are allowed to sit in outpatient clinics, and there are usually specific requirements in terms of working years and titles. According to the interview data, the doctors who attend outpatient clinics are usually associate chief physicians or above and have worked in the clinic for more than ten years. Some physicians at the administrative level attend specialist clinics only half a day a week. Therefore, the usual outpatient time only accounts for 16% of the doctor's work. However, according to the data of Shenzhen Second People's Hospital, the outpatient volume in 2020 is about 1.55 million, and the average daily outpatient volume is 4,260, which will give an average of 8 minutes of consultation time for each patient in a seamless situation.⁶ In some larger tertiary hospitals, the outpatient volume is even higher, and the pressure on physician visits is even higher. The rest of the physician's time will be spent on research, scholarly communication, mentoring interns, rotating physicians, and graduate students.

Chinese doctors' are currently working at high capacity, with more than 65% of healthcare workers working more than 48 hours per week. Nearly 90% of healthcare workers earn less than 8,000 yuan per month. Among the factors that plague healthcare workers, 77% of them have heavy workloads in the first place, followed by doctor-patient conflicts occupying 57%. Other factors are the promotion of positions, continuing education, and the relationship with leadership colleagues. In contrast, 70% of Chinese healthcare workers' sense of accomplishment was patients' trust and

⁶Source: Data from Shenzhen Second People's Hospital

recognition, 40% thought it was a technical promotion, followed by social status, more opportunities for continuing education, and only about 20% thought the sense of accomplishment came from salary income.⁷

In general, the current situation of Chinese doctors is that they work under high pressure and earn low salaries. Moreover, they spend only 16% of their usual working hours in outpatient clinics. At last, their most incredible sense of achievement comes from the trust of their patients and the improvement of their technical skills.

7.1.8 Nurse

In 2021, there will be 260 million people over 60 years old in China, of whom more than 45 million will be disabled and semi-disabled, while the total number of registered nurses in China is 4 million at present. Under the vast market demand, the number of nursing practitioners for the elderly is relatively tiny. The professional quality of nursing staff is uneven, and the job mobility is significant. Specialist nurses usually need to go through seven years of studying to obtain nurse practitioner qualifications. Their salary level is generally low, 76.5% of nurses' salary is less than 5,000 yuan, and only 4.5% of nurses' salary is higher than 8,000 yuan.⁸

Most nurses working in professional nursing, especially those with high-quality nursing skills, are concentrated in tertiary hospitals. The current workload of nurses is high, and most nurses are already overworked. Furthermore, statistically, most of the nurses' work is spent on writing medical records.

⁷Source: Data from the White Paper on the State of Physician Practice in China

⁸Source: Data and calculations from the National Bureau of Statistics and the National Health Commission

7.1.9 Patient

Under the influence of the COVID, the total number of visits to health care facilities in China remains 7.74 billion for 2020, with an average of 5.5 visits per resident. Of these visits, 84% are to public hospitals, and 16% are to private hospitals. The average of 5.5 visits is a relatively low-frequency time for patients. However, the average time per patient posted at a visit is long. "Three hours in line, five minutes to see a doctor" is a pain in the heart of many patients, and it is difficult to register for a number and even more difficult to register for a specialist. Not counting the commuting time on the road, it usually takes most of the day or even a day for a minor illness or a review. Patients will now generally choose large tertiary hospitals, and few people will choose community health service centers, township health centers, and other primary care institutions. According to statistics, 92% of patients choose secondary and tertiary care institutions, and only 8% of patients will principle primary care institutions. So the utilization rate of primary health institutions is also a problem.⁹

There is no medical experience for most patients, and the patient follows whatever the doctor's diagnosis is. Therefore, the patient always trusts the doctor after a consultation. Before a consultation, the patient's trust in the doctor comes mainly from the doctor's credentials. Moreover, patients' trust in offline doctors is significantly higher than in online. Therefore, if the services outside the hospital are extended from in-hospital visits, it is evident that patients' trust in medical services will be improved.

Patients currently have isolated medical data and cannot access their data through a single portal. Not only that, medical data obtained at different hospitals may not be fully applicable at other hospitals. This data isolate leads to duplicate tests and unnecessary costs.

After the epidemic, people's health awareness has been significantly enhanced with spontaneous attitudes and greater emphasis on personal health management and

⁹Source: Data from Statistical bulletin on the development of health in China 2020

chronic disease management. With the increase in the elderly population, there has been a significant increase in the demand for quality improvement of medical services. Since medical services initially focused only on the acute phase, not much attention was paid to post-acute services, significantly improving the quality of survival through rehabilitation care, especially when repeated hospital admissions led to lower quality of survival for patients. However, with the increase in life expectancy per capita, the related needs are driven by the patients' desire for better care outside the hospital.

Therefore, patients' most significant pain point is that the shortage of quality medical resources has led to inefficient and challenging access to medical care. The limited treatment capacity of primary hospitals leads to low access to primary health institutions. Patients' trust in doctors is also based on their popularity and after a consultation. With improved living standards, people are more aware of their health and pay particular attention to personal health management and chronic disease management. Moreover, the demand for quality medical services has become higher, especially from completing the visit to the extension of out-of-hospital care.

7.2 New business model

Through questionnaires, interviews, and research, we analyzed the points of interest of stakeholders such as the government, insurance companies, drug and device manufacturers, hospitals, doctors, nurses, and patients, as shown in the Figure 7-2. They can be briefly summarized as follows.

The government wants good social security, a higher level of health care and primary health insurance for the population, and the need to use social insurance funds wisely. The core interest of commercial insurance companies is to perceive the vast potential market, attract more participants through cheaper and more convenient channels, and understand the insured better, starting from health management to achieve a healthy control of medical expenses. Pharmaceutical companies are cur-

rently feeling tremendous policy pressure in China and urgently need to undergo a strategic transformation to reduce internal operating costs, improve marketing and sales efficiency, and achieve sustainable revenue and profit growth in price for volume. The core interest of wearable medical device manufacturers is also to gain more sales revenue in a market with great potential and obtain more data information on IoT devices to achieve further improvement in the company's product iteration and sales. Under the policy of regulating medical costs, traditional hospitals need to control costs and expenses, improve operational efficiency, protect the fundamental interests of patients and maximize the value of medical services to maintain sustainable operations. The main pain point of Internet hospitals is the isolation of medical data and the limited technical capacity and infrastructure of Internet hospitals upgraded by traditional hospitals. Then there is the shortage of physician resources and the problem of health insurance coverage, and the failure to find a sustainable business model. For the major players, doctors in public hospitals are under tremendous work pressure, with a lot of research pressure but not a fair salary. Due to the high seniority requirements for outpatient doctors and the high clinical workload, the proportion of time doctors spend in outpatient clinics is relatively low. Doctors spend a lot of time and energy on research data collection and medical record writing, but this is also a tremendous help in improving personal skills and research. Compared to physicians, nurses have a narrower scope of work, but they also have a great deal of work pressure and unsatisfactory pay due to the shortage of nurses. They spent lots of time writing nursing records. With the advent of an aging society, there is a vast potential market for disabled and semi-disabled elderly care. The most significant pain point for patients is that it is difficult and expensive to see a doctor. They are not willing to go to primary health institutions, and they are willing to go to tertiary hospitals regardless of major or minor illnesses. This situation is also due to the current status quo caused by the excessive concentration of quality medical resources. This situation makes it difficult to access large hospitals, and the utilization rate of primary hospitals is meager. Patients prefer to trust doctors they are familiar with or with a good reputation.



Figure 7-2: The Interest of Stakeholders in Healthcare Activities

We propose a new business model for Internet hospitals by combining the pain points, demands, and advantages of all stakeholders with relevant Internet technology platforms, elderly institutions, and other related groups.

7.2.1 Value Proposition

We provide healthcare professionals with clinical assistance, patient management, academic seminars, educational assistance, scientific research database, network consultation, intelligent medical records, intelligent nursing, and other systems to improve their medical skills on the platform, more convenient and fast medical, teaching and research work, intelligent medical records and nursing systems to shorten the repetitive workload of healthcare professionals, put more time to do more substantial work.

We provide hospitals with an Internet medical service platform for technical support and operation management, a mobile medical platform to connect hospitals and patients, a telemedicine platform to connect between hospitals, and an intelligent hospital management platform to improve the hospital's management level and operational efficiency. This platform will help the hospital service return to the essence of

medical treatment and give the professional technology to the professional platform.

We provide patients with convenient and fast medical services such as health consultation, remote diagnosis and treatment, prescription issuance, family hospital bed, health file management, patient medical data management, offline hospital appointment, consultation for complicated diseases, and chronic disease management. It allows patients to seek medical treatment and care at home without leaving home for minor illnesses, follow-up consultations, and more suitable treatment for significant illnesses and complicated diseases. Electronic health records allow patients to prevent diseases, health consultation, treatment, prescription, and appointment for medical treatment in a timely and convenient manner, and family hospital beds for post-visit management.

7.2.2 Customers

Our target customers are healthcare professionals, on the one hand, medical students, who can use the platform to learn medical knowledge, academic seminars, simulation of scientific data, etc. It can form the habit of using the platform from medical students to becoming full-fledged doctors in the future, increasing user stickiness and reducing learning costs. On the other hand, it is for young doctors, who have colossal workload, low income, and strong demand for a title promotion. They can use the platform to reduce the repetitive physical labor in their everyday work, deepen the consolidation and accumulation of medical knowledge through the auxiliary diagnostic system, and improve their medical skills by treating common and chronic diseases. The last aspect is senior doctors, who often do not match the patients they visit and lack patients with some complex diseases. The platform can make the matching of high-quality resources more accurate and increase senior doctors' sense of achievement.

Our target customers are also hospital customers, committed to improving the efficiency of their operations, reducing operating costs, and minimizing waste of health-

care resources.

Our target customers are also patients. For them, they can enhance their health management through the platform, but they can also enjoy more convenient and efficient access to accurate medical consultation services. The management platform for patient medical data can also help patients manage their health better and help them to reduce unnecessary medical expenses.

7.2.3 Core Assets

For the platform, the core assets mainly lie in digital assets. Massive desensitized medical research data, artificial intelligence-assisted diagnosis and treatment, accurate matching, search and recommendation algorithms, etc. are the core assets of the Internet hospital platform. In the future, doctors and patients who are the main customers of the platform and essential partners such as pharmaceutical companies and device manufacturers will also be the core assets of the Internet hospital platform.

7.2.4 Customer Relations

1. Community for knowledge sharing, research and education

The platform will establish communities with multiple customers for sharing medical knowledge, research data, and learning medical knowledge. Different customers can share or get help in different communities according to their needs. Through the establishment of the community, we can maintain a long-term and more profound connection with our customers.

2. Intelligent Services

The use of most of the functions on the platform is carried out through an intelligent system. Simplicity and convenience were the philosophy behind the design of the intelligent service platform. This system reduces the learning

cost for patients to use the software and makes it easier to maintain a stable frequency of use over time.

3. Exclusive personal assistant

For paying users with VIP subscriptions, a personal assistant will be specially arranged for them to enjoy a higher quality of service. It is also a pricing strategy to stratify users and maintain a better connection with premium and exceptionally high net worth users.

7.2.5 Marketing Channels

As a platform-type product like the Internet hospital platform, it needs to establish different marketing channels to carry out marketing activities early. We need to build our own sales team for hospitals and doctors' customers, establish channels in a mixed mode of Government and Business, and attract sample hospitals to the platform. After a specific influence of the hospital is stationed, it is necessary to cooperate with the hospital to promote and eventually partner channels for broader customer radiation. For the patient customers, the strategy is through the offline partner hospital diversion, coupled with the online Internet marketing strategy of the channel.

7.2.6 Key Businesses

For the doctor's side, the platform provides systems for clinical assisted decision-making, patient management, academic seminars, educational assistance, scientific research database, network consultation, intelligent medical records, intelligent nursing, etc. It opens up all doctors' career development stages from medical, teaching, and research aspects.

For the hospital side, the platform provides technical support and operation man-

agement, including a mobile medical platform connecting hospitals and patients, a telemedicine platform connecting hospitals and hospitals, and an intelligent hospital management platform improving the hospital's management level and operation efficiency.

For the patient side, the platform provides medical and health consultation and treatment services such as health consultation, remote diagnosis and treatment, prescription and dispensing, family hospital bed, health file management, patient medical data management, convenient offline hospital consultation, consultation for complicated diseases, and chronic disease management.

7.2.7 Revenue Sources

The primary sources of revenue include all stakeholders. We charge patients for consultations, drug sales, membership subscriptions, sales of medical-related products, insurance, etc. On the physician side, we mainly charge medical students and young doctors for their education, a portion of the commission for their consultation fees, and some fees incurred by some doctors for brand promotion. For pharmaceutical companies, we mainly charge value-added service fees for the use of desensitized data and pharmaceutical marketing fees. Insurance companies charge data usage fees and sales commission or fixed channel fees. We charge medical wearable devices or device vendors for platform fees.

7.2.8 Key Partners

Reaching closer ties with key partners can reduce the risk of uncertainty. The closer quality partnership enables economies of scale and reduced operating costs. It is also possible to extend the business and integrity of the platform through the specific resources of critical partners and different businesses, thus achieving the establishment of a complete Internet hospital from pre-hospital and in-hospital to the post-hospital

entire ecosystem. Therefore, we include all traditional hospitals and health institutions as strategic alliance partners in the relationship. Establish partnerships with insurance agencies, pharmaceutical companies, device vendors, and other ecosystem partners. We can also be open to some new business to explore in the future and even build joint venture relationships.

7.2.9 Cost Structure

In the pre-construction stage of the platform, the main cost comes from the cost of corporate staff, the cost generated by the technology construction. At the same time, there are also sales channel fees generated to achieve doctors, hospitals, and patients to be on the platform and the costs of various subsidies. In terms of cost structure selection, the main focus in the early stage was on value creation and building a complete multilateral all-around ecosystem of doctors, patients, and other parties. Through unique and high-value services as the driver, together with partners, we create more excellent economic and social value through economies of scale and scope.

7.3 Conclusion

Comprehensively, we propose a new business for the Internet hospital by analyzing stakeholders' pain points, demands, and interests in healthcare activities. The business model is to establish an Internet hospital platform, roughly divided into three ends according to different user categories: doctor-side products, hospital-side products, and patient-side products.

The doctor and nurse side products mainly provide medical, teaching, and research tools for doctors and nurses. From the medical tool's side, it provides systems for clinical assistance, patient management, network consultation, intelligent medical records, intelligent nursing, intelligent patient matching, etc. From the teaching side, it pro-

vides systems for teaching assistance, knowledge-sharing platform, title promotion, etc. From the research side, it provides systems for academic seminars, research databases, clinical trial planning, etc. The business model mainly charges drug companies, device manufacturers, doctors, and nurses. The value proposition of charging pharmaceutical companies is that they can provide value-added services for their R&D, promotion, and even clinical trials through the data on patient diagnosis and medication use generated by the platform. Especially in marketing strategies, the large amount of data can help pharmaceutical companies build good connections with doctors and patients and increase their visibility. The value proposition of charging doctors is to help them improve their clinical care by treating patients, helping them earn additional value-added income, enhancing their brand awareness, and bringing in patient traffic. From the perspective of career development, doctors can get complete career learning, planning, advice, and academic seminar opportunities. In order to increase the attractiveness of the platform for doctors in the early stage, they are free to access medical end products by encouraging doctors to ask for subsidies.

The hospital-side products mainly provide hospitals with an innovative medical platform, including a platform for technical support and operation management, a mobile medical platform connecting hospitals and patients, a telemedicine platform connecting hospitals and inter-hospitals, and an intelligent hospital management platform to improve the management level and operational efficiency of the hospital. It addresses the biggest interest concerns of hospitals, returns hospital services to the essence of medical care, and achieves cost control and cost reduction. The primary business model is not to charge the hospital but to charge like third-party organizations to reduce the cost burden for hospitals. The value proposition of charging third-party institutions is from several aspects. Banks hope to get the financial resources of hospitals through the Internet medical platform, bringing online cash flow, etc. Banks pay for the use of the channel. Insurance companies want to effectively and rationally control insurance expenses and can use the operational data of the Internet medical platform for insurance optimization and analysis. Insurance companies pay for the

use of data. Pharmaceutical companies and device manufacturers can also use the data of hospital-side products for R&D and patient analysis. At the same time, they can precisely match the patient population through data for projects that require clinical trials. Pharmaceutical companies and device manufacturers pay for the use of data.

The patient-side products mainly provide patients with a health consultation, remote diagnosis and treatment, prescription issuance, family bed, health file management, patient medical data management, offline hospital appointment, consultation for complicated diseases, chronic disease management, and other services. It aims to solve patients' whole closed-loop health management from prevention, treatment, and rehabilitation. Health records and health consultation can better enable patients to prevent diseases, while remote diagnosis and treatment, prescriptions, family hospital beds, offline hospital appointments, and consultations for complex diseases can help patients solve the expensive and challenging experience of seeing a doctor, queuing for 3 hours to see a doctor for 5 minutes, and having nowhere to seek medical treatment for complex diseases. Patient medical data and chronic disease management can help patients better target rehabilitation and prevent disease recurrence. The primary business model charges advertisers, insurance agencies, and patients. The value proposition of charging advertisers is to take advantage of the platform to advertise to doctors, nurses, hospitals, and patients. The platform has the advantage of traffic to achieve brand enhancement and direct traffic conversion by using precise marketing. Thus the advertisers can gain a more efficient, cheaper, and more accurate marketing channel and achieve a strategy of reducing marketing channel overhead and exchanging price for volume. The value proposition of charging insurance companies is that massive traffic leads to an increase in insured volume. Health management systems can help patients reduce disease incidence, thereby reducing insurance overhead. Many desensitized patient data can help insurance companies design better insurance products. The value proposition of charging patients is that the platform provides patients with a more convenient, faster, and high-quality medical experi-

ence. They can use some essential products for free. Charging the subscription and consultation fee models can realize the production of different quality services. The private doctor model can also provide a better experience and personalized service for high-end users.

Therefore, the business model of Internet hospital does not mean that it is all about profit, but rather that it is a scalable and sustainable profit model through the Internet hospital platform products for healthcare professionals, patients, hospitals combined with internal and external resources and partners to create, market and deliver products that can create value for all parties in a multi-win cooperation way.

Chapter 8

The Analysis of Marketing Strategy

The Segmentation, Targeting, Positioning (STP) framework is an analytical framework that has proven to be an excellent tool for marketing strategy. This chapter will use the STP framework to design a marketing strategy for an Internet hospital in the new business model proposed by Chapter 7.

8.1 Segmentation

8.1.1 Doctor-Side Product

The customers of doctor-side products are mainly doctors and nurses in hospitals and undergraduate and graduate students in medical schools. Doctors start learning all kinds of medical knowledge from medical students and also need to become qualified doctors to-be through non-stop practice and research gradually. After the internship training, they enter the hospital and start the long road of practicing medicine. From the initial internship, through the help and training of senior doctors and their study and practice, they gradually grow into qualified doctors who can practice medicine independently. Later, they become senior doctors through clinical practice and con-

tinuous study and research. Thus, demographics and work experience are the segment variables of the physician's product. When the physicians are between the ages of 18-26, they are primarily undergraduate and graduate medical students, those between the ages of 27-36 are relatively junior physicians, those between the ages of 37-50 are experienced senior physicians, and those over 50 being senior expert physicians. Age is only an average measure here, and the doctor's stage should be judged in combination with actual work experience and personal ability.

8.1.2 Hospital-Side Product

The customers of hospital-side products are mainly hospitals. Firstly, hospitals are broadly divided into public and private hospitals. Secondly, according to the hospital grading management method, hospitals in mainland China are divided into three levels, and each level is further divided into A, B, and C. There are additionally extraordinary levels for the third level hospitals, so hospitals are divided into three levels and ten levels in total. The third level is the highest level hospital, and the first level is the lowest level hospital. In addition, Fudan University ranks among the top 100 hospitals every year based on the overall rating of Chinese hospitals. Thus, hospital attribution, hospital ranking, and overall ranking are the segmentation variables of the hospital-side product.

8.1.3 Patient-side Product

The customers of the patient-side product are mainly the general public. Each generation has events that are unique to their generation. One generation has experienced a common culture, technology, politics, etc. They share similar educational methods, similar views, and value standards. According to the age of birth event, China usually divides the population into the post-50s, post-60s, and to post-20s. The age group born from 1990-to 1999 is known as the post-90s. Each age group has experienced

unique political, economic, cultural, technological, and other era developments. For example, the post-90s generation is characterized as a generation under the one-child policy, growing up in China's rapidly developing and affluent social class, and a generation that lives entirely in the Internet era. They are more educated and diversified as a whole, and at the same time, they have more and broader access to information and information. Therefore, the post-90s have some specialties different from those of other generations. Therefore, the generation will become the primary segmentation variable for patient-side products.

8.2 Targeting

When we analyze the targeting segment, we should cover the segment attractiveness, competitive advantage, and segment compatibility. These three parts are separately based on company analysis, competitive analysis, and company analysis (3C analysis framework). This part will analyze the three sides of products using the 3C analysis framework.

8.2.1 Doctor-Side Product

Customers on the physician side are mainly segregated by age and seniority for different products. The target group, in turn, is doctors under 50 years old, which contains undergraduate and graduate medical students between the ages of 18 to 26, younger doctors with slightly less seniority between the ages of 27 to 40, and experienced senior doctors between the ages of 40 to 50. Moreover, the target group will be different for different products on the physician side.

Medical Students

They mainly use knowledge-sharing platforms and teaching aids to master and understand medical knowledge more conveniently, efficiently, and intuitively. Moreover, interactive sharing also increases users' stickiness in using them. Furthermore, clinical aids, intelligent medical records, and other supporting diagnosis and treatment software during the student period will also reduce the learning cost and increase user stickiness after becoming a full-fledged doctor later.

1. Customer Analysis

According to statistics in 2018, the number of medical school graduates in China has reached 0.8 million, with a preliminary estimate of 3 million students enrolled and an annual enrollment growth rate of about 7%. This market is a long-term sustainable market. Although, as students, the purchasing power is not necessarily strong, the desire to buy and loyalty will be high. Usually, students are willing to pay a reasonable price for supplementary learning products to learn better and more efficiently. Students are a price-sensitive and time-sensitive group who need to consider reasonable price settings and incentives when developing specific marketing approaches.

On the other hand, medical students can be reached at a low cost. First of all, the target is particular and does not need to be reached through significant traffic and advertising. Take some more simple, brutal, and grounded marketing methods to achieve low-cost, efficient customer acquisition.

2. Competitive Analysis

Most of the products used by medical students are mainly monolithic products with specific functions, and they are relatively old and outdated. As our products for medical students, firstly, they are more cutting-edge. We provide students with more convenient and understandable auxiliary software through artificial intelligence to assist in teaching, medical treatment, and intelligent

medical records. Second, the rich software systems can interdepend on each other so that users can enjoy the platform's advantages and no longer need to switch between the use of various products. In addition, the software platform used in the future after becoming a full-fledged doctor is continuity, reducing the learning cost and increase user stickiness.

3. Company analysis

Doctors are the most critical resources of the Internet hospital platform. Moreover, medical students are an essential foundation and reserve resource for the long-term sustainable development of the Internet hospital platform. Therefore, the group of medical students will become the foundation of the future platform and the driving force for sustainable growth in terms of the overall construction of the Internet hospital platform.

Young and Senior Doctors

For young doctors between 27 and 40 years old with slightly less seniority, their main profile is shallow seniority, focus on medical technology improvement, heavy research study tasks, and high promotion pressure. Therefore, title promotion systems, academic seminars, and research databases are the main products used for this group. These systems can help them better consolidate and improve their medical skills, plan their career advancement scientifically and orderly, and improve their scientific research efficiently. For doctors aged 40 to 50, their user profiles are mainly experienced in medicine, with limited internet and computer skills, a conservative attitude towards new technology, and a focus on medical heritage and research of challenging diseases. Therefore, clinical support, intelligent medical records, and teaching aids are the target products for this group of doctors. In general, young doctors, primarily born in the Internet and mobile Internet era, have more time and motivation to use Internet medical products. For senior doctors, the ability to do their current work more quickly and efficiently motivates them to use Internet medical products.

1. **Customer Analysis**

Currently, China has more than 4.08 million physicians and about 4 million nurses, with more than 90% of the population between 27 and 50. As people demand medical resources more and national policies encourage more students to enroll in the medical profession, the number of people practicing medicine will continue to grow. Although doctors' product purchasing power is not strong and willingness to pay is not strong, loyalty is high. A joint marketing plan needs to be designed by taking a revenue share of the product with the patient side.

Since Chinese hospitals are managed from the top down, physician reach is straightforward and low costs. Reaching physicians is almost free or low cost as long as they can reach the medical institutions well.

2. **Competitive Analysis**

Most physician-side software currently used by physicians is a single, closed (for internal hospital use) product. The products are generally backward and have a single function. We have designed more intelligent software for doctors through artificial intelligence to assist teaching, assist diagnosis and treatment, and intelligent medical records. The open Internet hospital platform and the simple switching between rich software systems allow users to enjoy the advantages of the platform and no longer need to switch between the use of different products. In addition, the products used on the doctor's side are interoperable with the software for patient remote diagnosis, consultation, and health management. These advantages can increase the stickiness of doctors' use.

3. **Company analysis**

Doctors are the essential resource of the Internet hospital platform. Being able to attract young and experienced doctors to enjoy more innovative products and make them develop habits of use and stickiness to the Internet hospital platform will significantly increase the number of the supply side of the platform. It is

an indispensable group of people for the platform to reach its overall goal.

8.2.2 Hospital-Side Product

The previous chapter analyzed the Chinese medical system and its historical development. The attributes of Chinese hospitals are different. Some are hospitals with medical schools or hospitals affiliated with a medical university, some are specialized public hospitals, and some are private specialty hospitals. The first stage of the product segmentation for the hospital side is the top 100 public hospitals with medical schools or affiliated with medical universities as the target hospitals. The target hospitals will be considered geographically to ensure coverage of all provinces in China. This market segmentation is because, firstly, in the Chinese hospital system, the model hospitals will be the first to be copied by many hospitals like Peking Union Medical College Hospital and West China Hospital of Sichuan University. When these famous and exemplary hospitals use the Internet hospital platform and achieve good results, the future market expansion will not have to cost more. Secondly, in analyzing patients' trust in doctors, Chinese patients usually prefer to trust public hospitals, well-known hospitals, and well-known experts. In order to better attract more patients on the other end of the platform, the hospital side of the customer's positioning nationally known public hospitals. Furthermore, to ensure medical students better use the doctor-side products and form a complete ecosystem of the platform, giving full play to the ecological advantages of the products in medicine, teaching, and research. The preference of the hospital-side customers is to have a medical school or a hospital affiliated with a medical university.

The hospital-side product is provided free of charge for hospital use and must be as a representative. Again, for such hospitals with high academic and professional rankings, they are not very motivated to build Internet hospitals and intelligent hospitals. They want to spend more time on academics and professionalism. According to the data released by VBDATA.CN in 2021, most of the top hospitals in China currently

have an uneven development of the comprehensive level of disciplines and information technology capability. Therefore, large hospitals with comprehensive high rankings and not much experience in Internet hospital construction. They are more willing to accept free Internet hospital platform products to help them build and improve their comprehensive level of disciplines and informatization in a more balanced and efficient way.

1. Customer Analysis

The front-end target stratified customers are the top 100 overall, public hospitals with medical schools, and we mainly provide free product usage. As a top-down medical system, China's quality hospital resources are the hospital itself and the quality doctors and nurses resources in excellent hospitals. Furthermore, quality hospital customers are incredibly loyal, and the system is complicated to replace. The hospital customer base is minimal, and customer reach will be easy and costly, requiring a certain level of social resources and connections.

2. Competitive Analysis

Currently, hospitals are investing vast amounts of money in information technology and intelligent transformation, but the results are not outstanding. In particular, the overall ranking of the top hospitals in the overall level of information technology is in a moderately backward position. Compared with other competitors' products, the Internet hospital platform is more open and compatible. It enables more efficient unified management of hospitals and reduces the operating costs of hospitals in the context of the general policy of cost control and cost reduction. The most important thing is that the product is free for hospitals.

3. Company analysis

Although the product is offered to the target customer for free, the target group can bring core competencies to the company and enhance the company's brand image and reach the goals of the company's entire ecosystem.

8.2.3 Patient-Side Product

Through the questionnaire data, we found that most of the users who have used and are willing to use Internet healthcare are in the age range of 20 to 40 years old. Most of them are well-educated and have stable jobs, and they are receptive to new things, efficient, and willing to try different ways to achieve their goals. Another characteristic of this segment is the generation born under China's one-child policy and the generation that follows the national call to have two or three children. After they form a family, on average, two people need to support four older adults and raise at least one child. In addition, they are also the backbone of society and business and also need to spend much time on their work career. Therefore, efficiency, health management, and disease prevention are the key concerns of this group of people.

The current patient-side products, such as health consultation, health record management, and patient medical data management, are all preventive products that can provide this group of people with a more convenient and quicker entrance to manage the health data and health consultation of the whole family. When a family member has a non-emergency condition, they can directly assist the family in advising the doctor through remote diagnosis and treatment and using the functions of prescription and medication to advise the doctor conveniently and quickly. Suppose they have to go to an offline hospital for treatment or encounter some complex disease. In that case, they can make a convenient offline appointment through the Internet hospital platform. Some chronic patients or patients need to be hospitalized and do not have family members to accompany them. They can request the community or nurses to visit home to establish a family hospital bed, allowing this target user to conveniently take care of the patient. The only child generation is the primary target customer for patient-side products. After reaching this group of customers, they can reach older age groups through their referrals.

1. Customer Analysis

The current population of only children in China is 180 million. Although the future growth of this group will become less, this generation is the generation that will influence Internet healthcare and reach a larger group through them. This segment is large enough and has relatively strong purchasing power, with loyalty varying based on product features, convenience, and ease of use.

This segment will be more difficult and costly to reach. Therefore, specific marketing methods need to consider online and offline as more effective channels to reach them. At the same time, we need to use the linkage of hospital and doctor products and the support of health departments at all levels to form a comprehensive marketing plan. Since patients are the primary customer base of the platform, the initial customer acquisition costs are relatively high, and more investment is affordable.

2. Competitive Analysis

At present, the most significant competitors of Internet hospitals come from private Internet hospitals with some series of telemedicine such as Ping An Good Doctor, Spring Rain Doctor, and We Doctor. As far as the business model is concerned, all competitors are losing money and have not found a good profit model. As far as the products are concerned, they are relatively single, only providing some functional products on the patient side. There are no hospital side and doctor side products to form an Internet medical platform, and no synergy effect is formed. From the user side, the patient-user group of Ping An Good Doctor is currently the largest, and the cumulative users have reached 420 million. However, from the customer loyalty point of view, hospitals with online and offline services are more attractive. Just the current development of the Internet platform of major traditional hospitals lags. In addition, the Internet hospital must rely on the entity medical institutions. The entity medical institutions are the most profound understanding of the nature of medical care, laws, and regulations. They have enough foresight on

the risks of the medical process, and the Internet companies are inadequate. The attraction to the patient-side product is enormous after the future of the target group of hospitals is stationed.

3. Company analysis

The generation of only children is the current middle class of Chinese society and the primary target users. They pursue not only efficient and convenient medical experience but also trust famous hospitals and doctors. This group is the most important group of users to be attracted by the Internet hospital platform, and it also fits the core competence and ultimate goal of the company.

8.3 Positioning

Positioning is to find a unique place in the mind of target segments. This part will use a perceptual map to understand what customers need the products compared with competitors' products (Benefit) and use a positioning statement to generate a positioning concept to crystalize the unique benefit to customers (Concept).

8.3.1 Benefit

Through questionnaires, interviews, and research, we analyzed the interest of stakeholders such as the government, insurance companies, drug and device manufacturers, hospitals, doctors, nurses, and patients. There are two pairs of attributes that are most important to current users. One pair is the single product used by users (vertical market) and the platform-based composite product (horizontal market). The other pair is that patients prefer to rely on traditional hospital-based products through the Internet (more hospital-based Hospital+) and the Internet-based hospital services (more Internet-based Internet+). The main products in the market are also developed from these two dimensions. As shown in the Figure 8-1.



Figure 8-1: The Perceptual Map of Product

Teladoc and Amwell in the U.S. are mainly vertical single products focused on telemedicine, with different entry points for specific segments. Their core goal is to become a telemedicine company covering all care areas. They are both Internet-based companies combined with some offline physical clinics from another dimension. Amwell has its Internet-based telemedicine platform and has close cooperation with offline physical medical institutions to provide them with comprehensive telemedicine solutions. Therefore, compared with TelaDoc, Amwell has a good balance between the Internet and physical medical institutions and is more inclined to the Internet side.

China's Internet healthcare is primarily platform-based compared to U.S. Internet healthcare companies that focus on the telemedicine segment. For example, Ping An Good Doctor is a one-stop healthcare platform that provides comprehensive services, understands users' needs when they have medical needs and when they want

to stay healthy, and focuses on providing online medical services supported by artificial intelligence assistants. Its medical team tries to provide users convenient and cost-effective healthcare solutions and provides various offline services through a network of healthcare providers. Ping An Good Doctor also partners with insurance companies to provide value-added services to policyholders, enabling the synergistic integration of insurance and healthcare. The ultimate goal is to build a healthy ecosystem that improves the efficiency of healthcare resources while providing a superior experience for customers. Similarly, We Doctor is a digital health platform to build an intelligent digital health platform that covers medical, pharmaceutical, medical examination, and health insurance fields, covering the whole industry chain of Internet medical health. Based on the open Tencent cloud platform, We Doctor continues to improve medical services, reduce drug prices, improve the efficiency of health insurance funds, and innovate medical device research and development. Their HMP, Health Maintenance Platform, provides one-stop medical and health insurance services for users on and offline. Although Ping An Good Doctor and We Doctor have Internet genes, Ping An Good Doctor is more inclined to the Internet model, starting from the user side and building a medical e-commerce platform with Internet thinking. In 2015, when the Wuzhen Internet Hospital was established, We Doctor helped 19 provincial and central hospitals to implement Internet hospitals and assisted more than 100 central hospitals in building medical associations and home medical contracting platforms. Therefore, the platform attributes of We Doctor are not as strong and widely compatible as Ping An Good Doctor. However, We Doctor is closer to the traditional hospital business and relies more on traditional hospitals to carry out Internet medical activities, while Ping An Good Doctor is more inclined to the Internet model of operating a comprehensive digital health platform.

Kyee's products are mainly oriented to help medical institutions improve service quality and efficiency, ensure medical safety, and effectively reduce system construction costs and operation and maintenance costs. Kyee's healthcare big data and intelligent ward services are mainly deployed in hospital intranets. Therefore, Kyee's products

are mainly single in-hospital and in-hospital informatization intelligent products for medical institutions. Based on the consultation platform, More Health relies on the advantages of innovation and high technology in Silicon Valley, integrates high-end medical resources in the U.S., and is committed to providing health services for Chinese, American, and international users. More Health's primary medical resources also come from high-end medical resources in the U.S. The product type is relatively single, mainly a consultation platform. Compared with Kyee, which provides information technology and intelligent products for medical institutions, More Health is a single product for traditional medical institutions, while Kyee also focuses more on in-hospital products but is more Internet-based and richer in products.

China-Japan Friendship Hospital is an Internet hospital platform built based on traditional hospitals. At the same time, it will jointly develop a common platform and operation and maintenance management with third-party companies. The platform is open to all medical institutions and operating companies to explore establishing a diversified and long-term operation demonstration system. In the future, they will gradually open up the business of family hospital beds and family rounds, and online nursing care to provide medical care for chronically ill patients in-home care and grassroots community care. However, due to traditional hospitals' limited technical capacity and operation level, it is currently encountering many problems in the development process. It is more of a platform product for traditional hospitals from the starting point.

The business model and market positioning we are exploring also belong to this quadrant, a platform product that is relatively more on the side of traditional hospital business. Our strategy is to rely on physical medical institutions because they have the most profound understanding of the nature, laws, and regulations of medical care and have enough foresight on the risks in the medical process, which is not enough for Internet companies. Moreover, it can provide an all-in-one Internet hospital platform for doctors, medical students, nurses, patients, and medical institutions. It can solve the current pain points of medical students' study, scientific research, and career

planning. It can also solve the pain points of doctors and nurses' work efficiency, career promotion, technical level improvement, and treatment level improvement. It can help to solve the core demands of hospitals' low management and operation level, limited technical level, and colossal operation cost and to solve the vital demands of patients' medical difficulty, expensive medical treatment, low medical efficiency, no access to medical treatment for complex diseases and poor preventive health management.

8.3.2 Concept

Our positioning statement is to explore the Internet hospital platform, an all-in-one platform for doctors, medical students, nurses, patients, and medical institutions. Unlike current Internet healthcare products that focus entirely on the patient, this platform focuses on all aspects of medical activity. It provides a more complete and transparent platform for medical students to share knowledge, learn, and plan their careers, as the platform's services run the entire path from student to the proper medical expert. The platform is a working station for young doctors and specialist doctors in hospitals to improve their efficiency, medical skills, professional titles, teaching, research, and more rational planning of working time. Because the platform not only has software for intelligent research, teaching, and consultation but also builds a bridge for efficient communication with patients and peers. The Internet hospital platform provides free and more comprehensive technical support, operation, and management of intelligent hospitals and intelligent medical platforms for the top 100 hospitals with medical schools. Because the intelligent platform can improve the hospital's operational efficiency, reduce operating costs, and better cope with the cost of reducing fees and controlling costs. The Internet hospital platform also provides an intelligent platform for the middle-aged and young people of the only-child generation to seek medical treatment quickly, match accurately, manage health, file data management, complex diseases, and provide offline hospital services. Because it has services and businesses covering the whole process of medical treatment.

8.4 Conclusion

In general, we segment the users of the doctor-side product by age and work experience, segment the hospital-side product by hospitals' rank and grade, and segment the client-side product by generation. We set the target customers of the doctor-side product as medical students aged from 18 to 26 and doctors aged from 27 to 50 with different working experiences. The hospital-side product targets hospitals in the top 100 public hospitals with medical schools. The target users of the patient-side product are those under the "One Child Policy" generation. The positioning of the whole Internet hospital platform is to provide an all-in-one Internet hospital platform for doctors, medical students, nurses, patients, and medical institutions. Unlike current Internet medical products that focus entirely on the patient, it focuses on all aspects of medical activity.

Chapter 9

Conclusion

This paper compares the healthcare systems and the different definitions for Internet hospitals in China and the U.S., analyzes the internal and external factors of China's Internet healthcare industry by the PEST and SWOT analysis frameworks, explores the current leading companies of Internet healthcare in China and the U.S., and propose the establishment of an Internet hospital platform based on the core of doctors and hospitals. The platform is a doctor-side, hospital-side, and patient-side integrated platform. Moreover, through questionnaires, interviews, research, and data analysis of all stakeholders about medical activities, a new business model for Internet hospitals with hospitals and medical personnel as the core is proposed. This platform provides hospitals with a free intelligent medical platform to improve their management and operational efficiency, achieve cost control and cost reduction, and return hospital services to the essence of medical care. It provides doctors and medical students with some free products to help them improve their work and learning efficiency and plan their careers clearly from medicine, teaching, and research. Furthermore, the platform provides patients with paid products to solve the current difficulties in accessing medical care, expensive medical care, and preventive health management. Insurance companies, pharmaceutical companies, and device manufacturers can pay to use the desensitized data from the platform for cost control, product design, clinical

trial planning, and product sales. The new business model is centered on doctors and hospitals, considering the demands of all stakeholders involved in medical activities and forming a sustainable and profitable multi-win Internet hospital ecosystem. The new business model is combined with a marketing strategy targeting the only-child generation, medical students and medical staff between 18 and 50 years old, and the top 100 hospitals with medical schools in the overall ranking. We aim to use different marketing tools to reach target users more conveniently. The meaning of the platform is to create, market, and deliver products that can create value for all parties in a multi-win cooperative manner through Internet hospital platform products for healthcare professionals, patients, and hospitals combined with internal and external resources and partners to achieve a scalable and sustainable profit model.

Bibliography

- [1] Habib Chaudhury, Atiya Mahmood, and Maria Valente. Advantages and disadvantages of single-versus multiple-occupancy rooms in acute care environments: a review and analysis of the literature. *Environment and Behavior*, 37(6):760–786, 2005.
- [2] Richard W. Jones. Diabetes and telehealth in china: Diagnosis, treatment and intervention. In *2018 9th International Conference on Information Technology in Medicine and Education (ITME)*, pages 148–153, 2018.
- [3] Harrison Miner, Karl Koenig, and Kevin J Bozic. Value-based healthcare: Not going anywhere—why orthopaedic surgeons will continue using telehealth in a post-covid-19 world. *Clinical Orthopaedics and Related Research*, 478(12):2717, 2020.
- [4] Xiaojuan Shen, Weixin Yang, and Shaorong Sun. Analysis of the impact of china’ s hierarchical medical system and online appointment diagnosis system on the sustainable development of public health: a case study of shanghai. *Sustainability*, 11(23):6564, 2019.
- [5] Shawn R Valenta, Meghan Glanville, and Emily Sederstrom. Telehealth development, implementation, and sustainability challenges: An introduction into the telehealth service implementation model (tsim). *Telemedicine*, pages 61–69, 2021.
- [6] Feng Yang, Huilin Shu, and Xiaoqian Zhang. Understanding “internet plus healthcare” in china: Policy text analysis. *Journal of Medical Internet Research*, 23:e23779, 07 2021.
- [7] 吴凌放. 促进互联网诊疗发展的若干思考. *卫生软科学*, 35(6):3–5.
- [8] 林毅夫. 中国医疗体系的发展历程与改革探索, pages 14–17. *国际金融*, 2021.