

# Analysis on the Development of Medical Robot Industry in the Post-epidemic Era

## -- Take Taizhou Medical High-tech Zone as An Example

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### Abstract

**The reform and innovation of the medical industry is related to the health of human life and death, and the in-depth penetration of "Internet +" has accelerated the reform of the digital medical industry. In the post-epidemic period, the importance of artificial intelligence in the medical field is highlighted. The emergence of medical robots at the right time has innovated the medical industry model and led to a new change in medical technology. At present, From the relevant bidding data, we can see that the medical robot industry is popular in the capital market, and has brought innovative development in rehabilitation, assistance, medical assistance and other aspects. Starting from the rationality of the development of medical robot market, this paper focuses on the analysis of the current demand opportunities of Taizhou Pharmaceutical City, and puts forward the future development direction of medical robots in Taizhou Pharmaceutical City.**

### Keywords

**Medical robot; Post-epidemic era; Taizhou Pharmaceutical Park.**

## 1. Introduction

With the accelerated development of the world economy and the development of emerging information technology represented by big data, medical robots have begun to be valued and gradually applied, but at present, medical machinery and equipment are still in the stage of artificial auxiliary manipulation. The improvement and development of information technology and the market demand for high-quality medical consumer services, It continuously guides intelligent, precise and interactive medical robots to carry out autonomous control and setting operations, and accelerates the updating iteration and development process of the medical industry. [1] The epidemic situation drives the market demand for medical robots to meet the needs of cutting off the source of infection and avoiding cross infection. This epidemic has brought many new application scenarios to many intelligent robot companies, making more people aware of the huge market of medical robots such as surgery, rehabilitation and assistance. With the gradual stabilization of the epidemic situation in China, the state has begun to attach importance to the current situation of backward and shortage of relevant medical facilities, increase investment in the medical field, and conduct in-depth exchanges and cooperation in various fields. The rapid penetration of new technology has realized the rapid development of "medical + artificial intelligence".

With the acceleration of "unmanned property" and the explosion of unmanned use scenarios, the explosive growth of medical robots has also attracted the attention of academia. Since the outbreak of the epidemic, medical robots have been taken over by the public in an unexpected way, and the application scenarios have been continuously expanded and upgraded. With the help of the epidemic situation, disinfecting robots have become the main force in the market,

disinfecting and sterilizing. Cut off the transmission of the virus through the air, contact, etc. Self-help consultation, robot temperature measurement, these technology models to achieve zero contact, have become common in the epidemic, and the value of medical robots is inexhaustible.

Highlight. "In the short term, medical robots can reduce part of the loss, reduce medical costs and improve treatment efficiency," Pan Jing said. In the long run, the outbreak of the epidemic has provided excellent opportunities for the development of the medical robot industry, highlighted the value of medical robots, brought great convenience to consumers, stimulated the demand for robots to replace manual labor, and made a big step forward in the development of the industry.

With the expansion of the investment scale of medical robots, the development of the industry has become a major problem. How to upgrade medical robots iteratively in the business market in the future? How to increase investment in intelligence? In the context of the post-epidemic era this paper focuses on the analysis of the opportunities faced by the medical robot industry, and puts forward the future development direction of Taizhou Medical High-tech Zone.

## 2. Analysis of the Development Status of Medical Robot Industry

### 2.1. Analysis of Foreign Development Status

In recent years, the global medical robot market has grown rapidly, with surgical robots accounting for the largest proportion, while rehabilitation robots are growing fastest with the aging of the population. Foreign medical robots have been in the leading position for a long time, and the medical robot market is fiercely competitive. At the present stage, American enterprises are taking the lead, and American surgical robots account for 55.1% of the global market. The European Union is the second largest market for surgical robots, accounting for 21.4% of the global market. It is reported that the global medical robot market will break through 20 billion US dollars in 2021.

### 2.2. Analysis of Domestic Development Status

Medical robot manufacturing in China lags behind developed countries such as Europe and America. With the continuous expansion of medical robot application scenarios and increasing market space, China has begun to attach importance to the R & D of relevant technologies. In terms of policy support, in September 2018, Beijing established the Medical Robot Industry Entrepreneurship Center, and issued the Action Plan for Innovative Development of Beijing Robot Industry (2019-2022) in December 2019, bringing medical robots into the development pattern of Beijing robot industry.[2] In the support of medical robot research platform, medical robot, as one kind of service robot, is applicable to the medical treatment of hospital and clinic or help medical treatment.[2] In 2011 and 2014, Shenzhen issued Shenzhen 12th Five-Year Plan for Scientific and Technological Development and Shenzhen Robot, Wearable Equipment and Intelligent Equipment Industry Development Plan (2014-2020), and positioned Shenzhen as the main production base of service robots in China, including the production and manufacturing of medical robots.[2] The platform and large-scale construction effectively promote the innovation research and development of local medical robot.

From the current point of view, a number of medical device enterprises in China have started the research and development of medical robot technology, 5G, artificial intelligence and other new technologies and medical robots to accelerate the integration, industry agglomeration characteristics are obvious, mostly distributed in the Yangtze River Delta, Pearl River Delta and other regions. In 2018, the domestic medical robot market reached 3.57 billion yuan, and is expected to exceed 6.3 billion yuan in 2020. The epidemic will greatly improve people's awareness of robots, and China's industrial robot market is expected to grow in 2020, said Lu

Zhangyuan, director of the Robotics Research Institute of Gaogong. In the areas of medical recovery, distribution logistics, catering and retail, there will be a "blowout" increase.[3]

On the whole, the application of medical robots in China's medical industry has not yet achieved large-scale popularization, and there is a lot of room for improvement in application fit and market maturity. From the perspective of industry development prospects, the large-scale use of medical robots will be a major trend in the future medical field. According to the statistics of the International Federation of Robotics (IFR), it is estimated that by 2025. The market scale of intelligent medical robots in China will break through 10 billion yuan.[4]

### 2.3. Industry Development Opportunities and Challenges

As a new industry with high technology threshold in the world, medical robotics industry needs a lot of capital, big data, Internet, clinical trials and talent support. China's medical robots are still in its infancy, and the industry is facing the adverse situation of "low-end products, large quantity, small scale, and serious vicious competition". Compared with developing countries, there is a big gap in development: the low degree of centralization of industry development, the lack of relevant medical compound talents, and the weak ability of innovation and R & D.

At the same time, the establishment of medical robot brand awareness is a long-term process, which requires long-term investment in market research and development, quality control and other aspects, and it is difficult to establish in a short time. Therefore, one of the keys to break through the market lies in the determination of product characteristics and advantages and effective product promotion. We should know that the medical robot industry has a high technical content of products and needs a large amount of funds. Strict regulation poses a greater threat to new entrants. This makes the barriers for new entrants in the industry higher, and many robotics companies abandon the market. In addition, the digital development of "Internet + medical treatment" under the epidemic situation, the innovation of new ways of connection between people, and the innovation of service mode bring new demands and scenarios, and broaden the development space of the industry market. Creating bright spots and breaking through high standards is a great opportunity to open up the market.

## 3. Feasibility Analysis of the Development of Medical Robot Industry

### 3.1. Market Prospect Analysis

The era of intelligence has come, and the application of intelligent medical robots is becoming more and more common. In the post-epidemic period, intelligent medical robots are playing an important role. As a hot technology and strategic commanding point, the development prospects of medical robots are self-evident, according to Boston Consulting estimates. The global medical robot market is expected to reach 11.4 billion US dollars in 2020, of which surgical robots account for about 60% of the market share.[5]

From the current development status of medical robots, the market prospects are broad, mainly reflected in the following aspects:

1. With the acceleration of population aging, the elderly population is a major demand for medical robots, and the demand for medical robots is increasing, especially rehabilitation robots.
2. The overall situation of the development of the robot industry is good, with the continuous development and progress of technology, medical robots continue to mature. According to the survey data, the global robot market is expected to grow moderately in the post-epidemic era, and is expected to resume low-speed growth in 2020 and 2021, with an estimated growth rate of 11.64% and 10.64%, respectively.

3. Diversification of the use of medical robots, from the perspective of the use of multiple categories, there are rehabilitation robots, surgical robots, logistics dispensing blood collection capsules and other examples of help robots and service robots.

4. The epidemic situation drives the market demand for medical robots to meet the needs of cutting off the source of infection and avoiding cross infection. This epidemic has brought many new application scenarios to many intelligent robot companies, making more people aware of the huge market of surgery, rehabilitation, medical assistant robots and so on.

In general, the medical robot market industry has huge potential. With the gradual stabilization of the epidemic situation in China, the state has begun to pay attention to the current situation of backward and shortage of relevant medical facilities. With the advent of the post-epidemic era, the state and society have increased investment in the medical field.

### **3.2. Analysis of Existing Medical Device Industry and Region in Taizhou**

All along, medical devices have been one of the key growth industries in China Pharmaceutical City. At present, the medical device industry in China Pharmaceutical City has a solid scientific research platform foundation. There are three provincial engineering technology centers, nine municipal technology research centers, four public innovation service platforms, one medical device inspection Institute and one medical device research Institute. According to the latest statistics, as of August 2020, 386 medical device enterprises have settled in China Pharmaceutical City, 140 medical device enterprises have obtained production licenses, and 1857 medical device registration certificates (record certificates) have been obtained. The total number of in vitro diagnostic reagent registration certificates (including record certificates) is 1107. The total number of non-diagnostic reagent registration certificates (including filing certificates) is 750.

At present, the scale of Taizhou pharmaceutical industry has reached 120 billion yuan, as the first national pharmaceutical high-tech zone, has gathered more than 1000 domestic and foreign pharmaceutical enterprises. At the same time, Taizhou Medical High-tech Zone is the only pilot project for the development of large health industry agglomeration in the Yangtze River Economic Zone in China. As well as the "Taizhou National Pharmaceutical and Health Industry Innovation Center" explicitly supported by the "Yangtze River Delta Integration Development Planning Outline", Taizhou Pharmaceutical Industry has the superposition advantages of the two national strategies and certain first-mover advantages.[6] According to statistics, in 2020, Taizhou pharmaceutical industry enterprises achieved output value of 118.962 billion yuan, sales of 117.224 billion yuan and profits of 12.871 billion yuan, increasing by 17.14% and 14% respectively. The sales scale accounted for 26.91% of Jiangsu Province. Therefore, Taizhou Medical High-tech Zone can seize this opportunity and pay attention to the development of medical robot industry.

## **4. Countermeasures and Suggestions for the Development of Medical Robot Industry -- Development of Taizhou Medical High-tech Zone**

### **4.1. The Park Promotes the Innovative Development of Enterprises and the Rational Layout of Taizhou Medical Robot Industry**

In the post-epidemic period, the importance of medical and health epidemic prevention is highlighted. Combining with the current new form, the innovation and development of enterprises is an important breakthrough. Build digital and intelligent medical services, ensure effective communication between upstream and downstream industrial chains, rationally distribute Taizhou medical robot industry, and realize the agglomeration development of the industry. Enterprises have stepped up the formulation of strategies and plans for industrial development. Actively respond to the pain points related to medical industry resources in the

post-epidemic era. At the same time, Taizhou Medical High-tech Zone should determine the orientation and key direction of the development of medical robot industry in the park, and carry out special incentive policies for the digestion, absorption and re-innovation of relevant medical device enterprises in the park.

#### **4.2. The Government Helps Enterprises to Gather and Develop, and Builds Taizhou Industrial Alliance**

At present, China's medical robot industry has a certain basis for large-scale development. On the one hand, the government helps the medical robot industry, clarifies the direction of industrial policy development, strengthens government planning guidance, policy incentives and organizational coordination, and promotes the development of enterprise agglomeration. It is committed to building a government-led and enterprise-oriented. The industrial alliance of sustainable innovation and development driven by clinical needs includes enterprises, R & D institutions and financial institutions with strong R & D capabilities in the park as the core members of the alliance.

On the other hand, the government needs to formulate relevant policies to help medical device enterprises to carry out technological public relations and innovative R & D and improvement of core technologies, and build a communication platform for alliance R & D and technological transformation. The government attaches great importance to the research and development of the industrial chain of medical robots, strengthens communication and coordination among various departments, and improves the level of service. At the same time, Taizhou Medical Park is encouraged to build a platform for medical services and scientific research, and to set up a corresponding research fund for medical robots. To promote the development of industrial clusters, we should rationally distribute industrial technology research and development institutions and technology incubators, and support the construction of key industrial parks.

#### **4.3. Establish A Shared Information Platform and Vigorously Develop the Regional Cluster Development Pattern**

Establish the "Internet + medical" information sharing platform, strengthen the health management of medical information through digital innovation technology, actively connect with the leading enterprises in the existing medical robot industry, realize the integration of online medical module functions and offline medical consultation, and achieve timely sharing of medical data to alleviate medical pressure. At the same time, With the Taizhou spirit of "unity and struggle, hard work, pragmatism and efficiency, self-improvement and striving for the first place" as the driving force, we will attract enterprises to enter the pharmaceutical related parks for project landing and guide new landing enterprises to join the industrial innovation alliance, forming a multi-regional cluster development pattern led by Beijing-Tianjin Wing, Yangtze River Delta, Pearl River Delta and other regions.

#### **4.4. Strengthen the Construction of Clinical Platform and Attach Importance to the Cultivation of Compound Talents in the Park**

Relying on Taizhou Campus of Nanjing University of Traditional Chinese Medicine, we will strengthen the construction of related disciplines, set up a comprehensive talent training project in Taizhou Medical Park, and provide platform support for the combination of research bases such as Taizhou Institute of Biomedicine and Medical Devices of Southeast University with clinical medicine. To guide enterprises to set up a corresponding talent pool mechanism and preferential treatment system to attract more innovative and entrepreneurial talents, the authorities should also encourage the park to recruit talents, tap outstanding medical experts to participate, and enhance the cultivation of medical and technical talents. Large medical institutions in Taizhou Pharmaceutical City will be built, and existing medical enterprises in the park will be encouraged to cooperate with medical institutions to carry out talent plans. To train

a group of compound talents who combine medical technology and can participate in the development and innovation of medical related technology.

## 5. Research Status and Data

At present, there are not many relevant studies we have searched for. The existing studies have combed the development status at home and abroad, analyzed the feasibility from various perspectives, pointed out the opportunities and challenges, and put forward suggestions for later development. Generally speaking, we believe that the changes in the demand of the global medical equipment industry in the "post-COVID era" are combined with the existing medical equipment industry in Taizhou. It is of great significance for the development of Taizhou's medical device industry to develop the middle and lower reaches of the medical robot industry chain for epidemic prevention and control and aging problems.

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