

# The Investigation of Bio-medical Science and Technology Innovation Service Platform in Guangzhou

Hong-Ming HOU<sup>1,a,\*</sup>, Hong-Shen PANG<sup>1,b,\*</sup>, Yi-Bing SONG<sup>1</sup>, Hai-Yun XU<sup>2</sup>,  
Jing-Hui-Ni XIONG<sup>3</sup>, Xiao-Yan JIANG<sup>3</sup> and Wei ZHANG<sup>3</sup>

<sup>1</sup>Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences, Guangzhou, 510530, P. R. China

<sup>2</sup>Chengdu Library of Chinese Academy of Sciences, Chengdu, Sichuan 610041, P. R. China

<sup>3</sup>School of Economics and Management, South China Normal University, Guangzhou, 510006, P. R. China

<sup>a</sup>hou\_hongming@gibh.ac.cn, <sup>b</sup>winsunpang@126.com

\*Corresponding author

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**Abstract.** After the information industry, biological medicine industry has become an important driving force for the world's economic and social development, meanwhile, various types of innovation platform of science and technology has become an important support for the development of biological medicine industry. In this paper, based on in-depth investigation and analysis to innovation platform of science and technology in the field of biological medicine in Guangzhou, we clarified the basic situation of platform construction, operation and service, found problems of these platforms and put forward strategies and policy recommendations.

## Introduction

Many countries put the biotechnology industry as the priority to the development of strategic industries in the 21st century, as an important means to enhance the competitiveness of domestic. For instance, the United States took biological medicine industry as a new economic growth point, and implemented "biotechnology industry incentives policy". Japan formulated the strategy of "biological medicine industry state". The EU used 45% of the research and development funds for biotechnology fields in FP6 (the sixth framework programme for research). The British government set up "biotechnology coordinate and guide committee" in 1981 and took various measures to promote the industry, universities and research institutions to increase investment in biotechnology development research. India established department of biotechnology and used 6000-7000 million dollars to the biotechnology and pharmaceutical research.

## Stage of Development of Biological Industry

Biological industry will gradually become an important driving force for world's economic and social development in the future. we divided the period of bio-industry into three stages, including the formation stage (1980-2000), growth stage (2000-2025) and the mature stage (2025-). Biological industry will truly become one of the leading industries of the world economy in 2020.

## The Features of the Biological and Health International Market

The world drug market mainly concentrated in North America, Western Europe, Japan and Latin America in 2000, account for 85.2% of the world's total sales. As for national, the world pharmaceutical market mainly controlled by the following eight countries: The United States (40%), Japan (11%), German (6%), French( 6%), Italian (4%), the UK (3%), Canada (2%), and Spain (2%).

Multinational companies control the international market. Enterprise merger and reorganization are successive. large scale of multinational pharmaceutical companies realize the complementary advantages

in the restructuring, such as Glaxo - Smithkline Beecham, Pfizer - Warner Bothe, Hurst - Barcelona, Astra Zeneca.

### **The Trends of the Bio-medical Field Science and Technology Innovation Platform**

Modern biological technology becomes a booster of the pharmaceutical industry development. In the past decade, 60% - 80% of the biological technology research and development activities focused in the field of medicine, biotechnology research and development has become the main force of the new drug development.

Natural medicine gradually becomes popular. With the advent of the return to natural boom, natural medicine for its unique efficacy and the side effects of smaller gradually was welcomed by patients, and its market share is increasing.

OTC market is developing rapidly. The OTC is increasingly becoming an important part of global pharmaceutical market, and the cold cough medicine, gastrointestinal drugs, pain relievers, vitamins, antifungal drugs, smoking cessation drugs, anti-allergic become the most potential OTC varieties.

New type of personalized service is more popular, communication in technology industry platform will be more in-depth and frequent.

### **Technological Innovation Service Platform in China**

In China, over 80% of the bio-medical companies were established not more than 5 year. Their projects are still in the initial period and the average employee does not exceed 30 people, and their funds not more than 5 million. Enterprise's main work is focused on the research and development of innovative products. Basically in the investment period, lacking capitals, researchers, development equipment and other hardware conditions become their fast-growing "bottleneck", greatly hindering their ability to innovate.

Therefore, it is very important to set up various forms of public service platform in various bio-medical medicine industries, and provide advanced equipment, technical support and other services for these companies.

We find that the main characteristic and development trends of bio-medical innovation service platform are as follows in China: Diversification of investment; Construction based on the bio-medical industry chain; to activate the various types of innovation resources as the primary task; operating strategy of combination of marketization and public welfare.

### **Technological Innovation Service Platform in Guangzhou**

In 2007, Guangzhou has become the national biological industry base city and the national medicine export base city with abundant medical resources, strong medicine culture, and solid industrial foundation. As a medical center and the pharmaceutical distribution center in southern China, Guangzhou medical resources ownership ranks third in the nation, and forms a relatively complete health care, health pension, health insurance, and other diversified services network, the medical service is radiating in Southern China area and Southeast Asia.

In Guangzhou, Several new policies were formulated to accelerate the bio-medical development from the industrial development strategy, talent, capital, tax and other aspects, such as *Opinions on promoting the Biotechnology Industry to accelerate development*, *Plan of Action on Biological Industry Development in Guangzhou(2010-2012)*, *Guangzhou Bio-industry "12th Five-Year" development Plan*.

### **Basic Analysis**

**Innovation System.** 11 national engineering centers and laboratories, 13 specialized incubators, 133 scientific research institutions, 153 key laboratories, 128 engineering and technology research and development center and 51 enterprise technology centers are built in Guangzhou.

**Innovation Ability.** In 2014, the invention patent application of Guangzhou biological and health industry reach 1905, while amount of granted patent is 1231. The number of PCT patent applications is 35.

**Industrial Scale.** In 2014, Guangzhou biological and health industry's main business income is about 150 billion RMB. The industrial scale and efficiency advantages have been increasingly highlighted.

**Talents Construction.** By the end of 2013, Guangzhou has 15 biological and health-related university and more than 40 research institutes. According to the survey, there are about 26560 technical personnel of the field of biotechnology and health in colleges and universities.

### Platform Distribution

As shown in Fig . 1, Guangzhou science and technology innovation service platform in the bio-medical field are mainly concentrated in the downtown area. Because of these types of national, provincial and municipal science and technology platform are mostly relying on construction of key universities or scientific research institutes. Therefore, the number of platforms mostly gathered in several universities and research institutes.

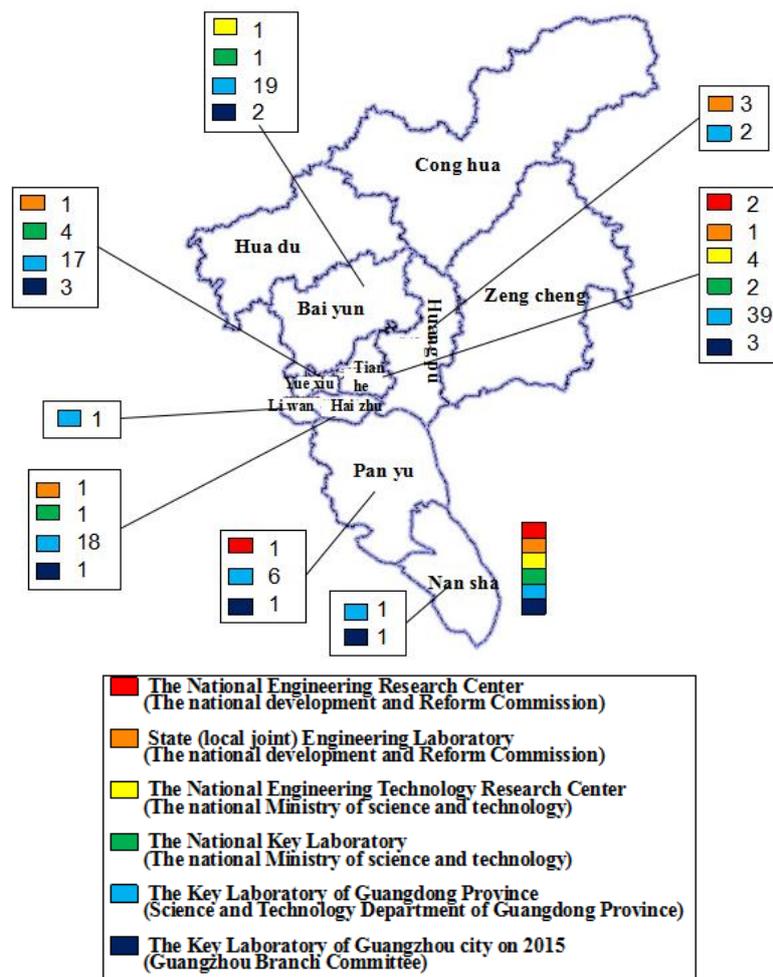


Fig .1 The National, Provincial and Municipal Technology Platform of Biomedical Field in Guangzhou

## Investigation and Analysis of Survey

### Content and Methods

The principal method of investigation for this survey is the questionnaire. Based on the survey sheet, meanwhile, choose some key service platform to carry on the on-the-spot investigation. The investigation is carried out by the website, telephone, e-mail, QQ group and other means.

### Investigation of Recovery

There are 77 institutes which can carry out scientific and technological innovation service independently filled out the questionnaires, including 140 innovation service platforms in this survey.

## Results (The Data of Survey Come from Guangzhou Biotechnology Center)

### I) Overview of Platform Service Resources

In this survey, 42 platforms belong to the biological service platform, while 35 platforms belong to drug development service platform. Biological platform total service area was 117817 m<sup>2</sup> and drug development platform was 129605 m<sup>2</sup>. There are a total of 2681 full-time technical service personnel. The average of each platform has 36 technical personnel to provide technical support and service. And the biological platform of senior technical staff accounted for 53%, the drug development accounted for 47%. For public service facilities, the number of biological platform facilities is 271, and the number of drug development platform facilities is 210.

### II) The distribution of the platform

Tab. 1 Types of Supporting Institution for Platforms

Platform types	colleges and universities	Research institutions/Medical institutions	Enterprises
Biological technology	7	14	18
Drug development	14	11	10

### III) Intellectual property and qualification of the platform

Tab. 2 Intellectual Property Rights of Platforms

Platform types	Publication works	Published Papers	Patent applications	Authorized patents	Formulating standards
Biological technology	12	714	179	217	3
Drug development	15	664	52	50	16

Tab .3 Qualifications of Platforms

Platform types	Municipal or above	Proportion	National-level	Proportion
Biological technology	18	43%	13	31%
Drug development	8	23%	2	6%

## Strategies and Policy Recommendations

Through the literature research, questionnaire survey, field investigation and consultation for the government management and related biological and health industry experts, the authors has preliminary completed the research on bio-medical innovation service platform in Guangzhou. Those innovation service platform should make full use of Guangzhou university, research institutes, enterprises, incubator, services and other existing equipment or scientific research resources, professional personnel to build and open a variety of forms of resource sharing system and service system, and adapt to the need of the innovation of enterprise development, to establish an efficient, convenient, open scientific resources service system.

On the one hand, Guangzhou can innovate platform construction and explore mechanism system model, on the other hand, it also need to optimize the construction of the existing platform. The concrete development strategies and policy recommendations are as follows:

## **Innovate Platform Construction and Explore Mechanism System Model**

I) construct national laboratory in biomedical fields

Guangzhou should select an strategic emerging direction of bio-medical field to construct national laboratory.

II) Lead to build the Pearl River Delta biomedical sharing platform

Firstly, Guangzhou needs to pay attention to improve the cooperative innovation policies and regulations at the time of construction, and guarantee the resource sharing. Secondly, establish reasonable collaborative innovation benefit distribution mechanism. Thirdly, improve the ability to innovate and the effect of regional cooperation.

III) Explore other types of platform construction mechanism

Moreover, Guangzhou could explore the construction of other types of platforms, such as Guangdong province - Guangzhou city co-building or Chinese Academy of Sciences - Guangzhou city co-building of scientific research institutions platform, and organized production and technology innovation platform based on leading enterprises.

## **Optimization of Existing Platform Construction**

I) Make plans and guarantee measures for existing platform construction

Guangzhou should take overall design to build the research and development service chain, and adjust the service supply and demand through the policy guidance for promoting innovation policy environment.

II) Improve the way of construction operations

The way of construction operations including: build multiple participation construction model, scientific examination and evaluation system, and service system for the overall management and coordination mechanism.

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