

Risk Analysis and Prevention Countermeasures of Guangdong Laboratory

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Abstract. With the acceleration of the national laboratory layout, Guangdong Laboratory is an important measure for Guangdong Province to strive for the national laboratory landing, and it is an important platform for Guangdong Province to enhance regional innovation capabilities. Guangdong laboratory in Province has just started, facing a variety of uncertainties. It is of great significance to ensure sustainable development through risk analysis and prevention. This paper analyzes the risk factors of capital investment, positioning, system, safety, personnel and infrastructure in the first two batches of Guangdong laboratory. The countermeasures are proposed from the perspective of government management departments.

1. Introduction

Along with a new round of scientific and technological changes and industrial revolution, the major platform represented by the national laboratory will become an important carrier of China's scientific and technological innovation. In the past half century, national laboratories or large-scale research bases in developed countries such as Europe and the United States (Huang Ji-hong et al. 2008), have achieved a large number of original achievements concerning the core competitiveness of the country. And the national laboratory has become an important force supporting the leading technology in Europe and the United States. In 2003, the Ministry of Science and Technology (Zhou Dai et al. 2007), prepared six national laboratories and explored the construction of national laboratories. However, 10 years later, there are no officially recognized national laboratories. Except for the Qingdao National Laboratory for Marine Science and Technology Pilots (He Jie et al. 2012), the other five Laboratories converted to national research centers. The failure of the signatories' institutional mechanisms was explored. In the past three years, national leaders have mentioned the construction of national laboratory (Li Yan et al. 2019) on various occasions, leading the development of key areas and indicating the acceleration of the construction of national laboratory. The economically developed local governments are eager to undertake the construction of national laboratory. So they have put the local level of laboratory through the laboratory construction to show the country's determination to build. For example, Shanghai launched Zhangjiang Laboratory. Zhejiang started the Yangtze River Laboratory. And Guangdong started Guangdong Laboratory. Fujian started Fujian Laboratory. Anhui started Anhui Laboratory. Jiangsu launched Zijinshan Laboratory. As the forefront of reform and opening up, Guangdong aims to cultivate and create national laboratory and build a national reserve preparatory team. In 2017 and 2018, two batches of seven Guangdong laboratories were launched, involving

regenerative medicine and health. Cyberspace Science and Technology, Advanced Manufacturing and Technology, Materials Science and Technology, Southern Marine Science and Engineering, Chemistry and Fine Chemicals, Life Information and Life Medicine, etc. The seven Guangdong laboratories are organized by Guangzhou, Shenzhen, Dongguan, Foshan, Zhuhai, Zhanjiang, Shantou, Chaozhou, Jieyang and other municipal governments. The government's capital investment in the past five years is about 50 billion. The research institute of the Chinese Academy of Sciences and Sun Yat-Sen University Harbin Institute of Technology, Tsinghua University, China Shipbuilding Industry Corporation, China National Offshore Oil Group Co., Ltd. and other units participated in the construction, providing investment in talents, infrastructure, technology, etc., because the implementation of the management mode is different from the traditional Scientific research institutions, that means the occurrence of risks. At present, Guangdong laboratories have been in operation for more than one year. With the deepening of the reform of the system and mechanism, and the deep synergy of scientific and technological innovation, there are facing Influencing factors such as capital investment, system construction, safety management, talent introduction, the construction of facilities and the development of dislocations, through risk analysis, putting forward countermeasures to prevent and solve the risk challenges is necessary.

2. Risk factor analysis

2.1 Funding investment

Guangdong Laboratory has the basic tasks of conducting basic and applied basic research, and has the characteristics of high input, long cycle and slow effect. At present, Guangdong Laboratory in the Pearl River Delta is invested by the local government. Guangdong Laboratory in the East and West of Guangdong Province is invested by the provincial government and the municipal government. For example, in the first assessment period, Pengcheng Laboratory which is located in Shenzhen in the Pearl River Delta, has received 8 billion yuan from the local municipal government. If the assessment results are good and above, then Pengcheng Laboratory will receive 4 billion yuan. In 2019, Zhanjiang Bay Laboratory in the northeastern part of Guangdong will receive 200 million yuan from the local municipal government. At the same time, it will receive 400 million yuan from the provincial government. However, due to the influence of the provincial and municipal government elections and the economic development trend of the local cities, it is impossible to guarantee the timely and full release of construction and operation funds and long-term stable support. At present, the annual operating budget of the laboratories in Guangdong Province has remained above 500 million. For Guangdong laboratories in the northeastern part of Guangdong, the local municipal finances are facing difficulties in raising funds. The provincial government's timely financial requirements are high because of the budget management, the provincial government can not guarantee that the year can be released on time, leading to the laboratory in the region can not carry out scientific research work according to the construction task book. When the assessment cycle comes, it may be rectified because the scientific research work is not up to standard.

2.2 Target positioning

Take the typical representative of the US Department of Energy's National Laboratory as an example, it closely serves the national strategic needs and provide a strong impetus for the construction of national laboratory. For example, Lawrence Livermore National Laboratory builds the dominant research field for nuclear weapon development, and then developed with nuclear weapons. This advantage has continuously gathered resources and has become one of the three most powerful national laboratories in the field of nuclear weapons research and development. Different from the US Department of Energy's National Laboratory, the top-down model of Guangdong laboratory construction is coordinated by the provincial government. However, local government as a major investor, there is also a need to promote the development of local industries, and there is a game between the government of the province and city. The manager of the laboratory is facing the

dilemma of the dilemma. It is an important issue for the manager to worry about what kind of laboratory to build and who to serve the laboratory.

2.3 supporting system

According to the "Guangdong Provincial People's Government's Several Opinions on Strengthening Fundamental and Applied Basic Research", "Guangdong Provincial People's Government Issues Notice on Further Promoting Science and Technology Innovation Policy Measures" and other relevant documents are deployed. Guangdong Laboratory has certain autonomy in the aspects of title evaluation, enterprise investment decision, independent science and technology project establishment, talent team introduction, equipment procurement, and land use. However, in the process of policy landing, it is necessary for the provincial and municipal government to link up and implement at various levels, to implement concretely, to break the constraints of existing policies. If certain links or management systems of certain aspects are "absent", it will increase risk of the laboratory operation. For example, if the self-assessment is a senior professional title, it is necessary for the provincial human resources support department to issue a self-assessment system for guiding the provincial laboratory title (including positive and advanced). The provincial laboratory must also develop a professional title evaluation system, and form a decentralized-autonomous-supervised closed loop. However, during the implementation process, the provincial human resources protection department has doubts about whether the laboratory has the ability to review, so the operational policies are not very enthusiasm. However, for the powerful laboratory, there is an urgent need for independent review. For which is weak, the laboratory does not want to be fully self-assessed, which is a contradiction. Therefore, whether it can effectively promote the introduction of specific policies tests the wisdom of the provincial government leadership, but also affects the laboratory operation.

2.4 Talent introduction

Guangdong Laboratory is highly concerned by the Guangdong Provincial Government. The local government has invested a large amount of funds and land. Talents are the key to the success of the provincial laboratory construction. As Guangdong laboratory has just started construction, they are in the exploratory stage in terms of institutional structure, development planning, and related policies. Outside researchers have a wait-and-see attitude toward the development of provincial laboratory. Some leading figures have developed on provincial laboratories, lacking of confidence. In order to introduce talents, most Guangdong laboratories have to rely on the influence of the participating units to adopt the way in which the introduced talents belong to the co-construction units and the actual work is carried out in the laboratory. Jihua Lab is mainly involved in the construction of the Physics Institute of the Chinese Academy of Sciences. The majority of candidates in Jihua Lab are willing to choose the Institute of Physics of the Chinese Academy of Sciences and then work in the laboratory. This kind of practice can only be used as an expedient in the early stage of construction. In the long run, the laboratory has no or only a small number of fixed personnel. At the same time, competitive remuneration is an important means of attracting talents. It is difficult for laboratory in Shantou and Zhanjiang to compare with the laboratory in the shoulder triangle. If the salary is equal, the local finance will not be able to afford. If the salary is too low, it is not attractive to excellent talents and cannot meet the needs of provincial laboratory.

2.5 Infrastructure

Seven Guangdong laboratories were all started. In the infrastructure construction process, they faced problems in land use and slow approval procedures. Except for Jihua Lab, other laboratories did not start. For example, Pengcheng Laboratory is located in the Shibilong block in the Nanshan District. The planned construction of the park in the future is 2,000 mu, and the application has been filed, pending the approval of the National Development and Reform Commission. According to this progress, when the first batch of provincial laboratories are facing assessment in 2020, it is still unclear whether the provincial laboratory infrastructure can make substantial progress. Since the construction of the laboratory workplace takes a period of time, in the current transitional stage, the laboratory mainly adopts the method of renting office buildings or providing office buildings by the

participating units, involving the issue of land property rights, fixed assets ownership, and funding approval. Genus is an important factor of laboratory asset management.

3. Countermeasures

The government needs to establish a stable investment guarantee mechanism. Through legislation or government guidance funds, it is good for clearing the responsibility of provincial and municipal government funding, summarizing domestic and international construction experience, and setting clear development goals. Such as laboratory in the Pearl River Delta region is expected to overcome key technologies and achieve leadership. For the laboratory in the north and the west of Guangdong, the target is more to serve regional economic development, and then to serve the national strategy.

The government must formulate special support policies to regulate provincial laboratory management. The administrative department needs to conduct targeted research and formulation of special policies for the development of provincial laboratories, and actively seek the support of relevant departments in equipment procurement and equipment. Policy support and breakthroughs in import tariff reduction, management of public institutions, etc., in-depth investigation of the current development of Guangdong laboratory construction. To guide and service the laboratory to improve the construction of rules and regulations, and promote the construction of laboratories in Guangdong Province is a good work.

Do more and more, and do a good job in talent service. The talent teams introduced in the laboratory were included in the Guangdong Province's major talent projects, double-employee salary and assessment, title evaluation, masters and graduates, and young talents. Practical implementation is actively docked by the Human Resources and Social Security Department to solve the problem of the staffing of laboratories in Guangdong Province, especially in the eastern and western regions of Guangdong. At the same time, the Guangdong Provincial Human Resources Security Department will solve the problem of comprehensive decentralization of professional titles to more provincial laboratories, and give play to the role of laboratory talent evaluation.

Strengthen coordination and communication, and promote infrastructure construction. Local government must speed up the examination and approval procedures for laboratory construction projects. The advantages of co-construction units is used to solve the problem of the provincial laboratory transition stage.

4. Conclusion

The construction of Guangdong laboratory is a new thing. There are no replicable samples in terms of leadership, organizational structure, operation management, etc. Guangdong laboratory is faced with various risk factors and require concerted efforts of the government, participating units, and laboratory personnel. It not only produces major scientific and technological innovations, but also establishes an institutional mechanism that is in line with the laws of scientific research and effectively stimulates the vitality of innovation, and gives full play to the role of experimental fields in national laboratory.

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