A Preliminary Study on the Development Model of the New Public Scientific Institutions in China

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Abstract
In China, a number of new public scientific institutions stand out. Everyone can be promoted or demoted and go out or come in, and remarkable results are achieved in terms of institutional innovation, scientific innovation and other aspects. But at the same time, this dynamic new thing is also facing the challenge of management, mechanism, culture, philosophy and other aspects and there are many problems. This paper will briefly analyze the advantages and characteristics of the new scientific institution, analyze its shortcomings and try to provide some ideas for the development of the new scientific institution.
Keywords: *public scientific institution; new scientific institution; management innovation*

1 Introduction

Chinese scientific institutes, after years of development, exploration and innovation, have formed various forms and flourishing pattern[1].

Because the operation mode and characteristics of self-supporting and enterprise management purely private institutions are closer to the enterprise and characteristics of the full non-profit scientific institute and full scientific institutions are closer to the traditional institutions[2], this paper will put an emphasis on the analysis of the most distinctive public scientific institution of the council and national scientific institution co-led two-track system in the new scientific institutions, and explore its development characteristics and existing problems[3].

The new public scientific institution is defined as: “a group of leading innovative institutions aiming at the international forefront, gathering top international talent and team, with an innovative platform of world-class scientific and development condition and level, taking supporting and leading strategic new industry to develop as the goal, market-oriented, with wealth as the driving force, with enterprise management as the mode, integrating scientific innovation and industrialization and grasping discourse power of the emerging industries”. The author believes that the new public scientific institution is born out of traditional scientific institutions and universities, combining scientific research and market service on the function, administration management and enterprise management on the system, the public and the private on the background and government funding and self-funded on the finance. In

China, Taiwan Industrial Technology Scientific Institute established in 1973 and Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences and other renowned scientific institutions are recognized new public scientific institutions[4].

Taiwan established the Industrial Technology Scientific Institute in 1973[5]. For forty years, the institute has a significant impact on Taiwan's industrial development from innovative scientific and development, personnel training, intellectual rights bonus, spin-off companies, incubation enterprises, technical services and technology transfer and other processes. In February, 2006, through friendly consultations of the Chinese Academy of Sciences, the Shenzhen Municipal people's Government and the Chinese University of Hong Kong, has been jointly established in Shenzhen[6]. It implements the council management and explores system and mechanism innovation. Currently the advanced institute has initially built scientific-based micro collaborative innovation ecosystem integrating scientific research, education, industry and capital[7].

Especially Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, as the pilot and pioneer of domestic scientific institution reform, its scientific-based micro collaborative innovation ecosystem supplemented by education, industry and capital have already caused widespread concern and discussion.

Its establishment mechanism, operation mode, personnel evaluation criteria, management style and other aspects need to be concerned. In the process of reform and development, it can be seen that not only advantages of the new public scientific institutions in these areas but also defects and deficiencies existing in the development and emphasize an improve in time to ensure the smooth development of the reform as well as escort for the healthy development of the new public scientific institutions.

2 Outstanding issues existing in the public scientific institution

There are still some outstanding issues of the new public scientific institution in the actual operation process.

2.1 High staff turnover

It is true that the impact of high staff turnover has two sides and is both favorable and adverse. And an important problem faced by the traditional scientific institutions and universities is of cured personnel, lack of mobility and of backwater. Therefore, high staff turnover in this paper is compared with the traditional scientific institutions and universities as well as the familiar high-tech R & D enterprise and not that of all industrial systems including the general manufacturing and so on.

Taking the public scientific institution S in southern China for example, there is a total of more than 1000 full-time scientific staff and the annual average flow rate is 16%. It is unthinkable for the vast majority of the traditional public universities and scientific

institutions. For scientific work, due to its particularity, researchers are required to be stable and high staff turnover is bound to have a negative impact.

Products and results of scientific institutions are achieved by researchers' brain paying, and if there is lack of high-level personnel, scientific institutions will not be competitive at all, or even can be said to be without the value of existence. Brain drain is a scientific institution personnel crisis warning device.

Industry influence, personal quality and the stable condition of scientific institution employees directly bring the overall impression and evaluation to the public. High turnover and brain drain will be harmful to the overall image of institutions, reducing the brand's reputation and even making the public have doubt on the value of the development of the new product, new process and new result.

The loss of brain drain is self-evident. They are carriers of the scientific research and their mobility is bound to cause the loss of information and technology and pose a threat to the survival of the institution.

The recruitment and selection of high-end scientific research personnel are of small supply, high requirement and long negotiation period and other characteristics. High staff turnover will substantially increase the operation cost of institutions.

Job vacancies caused by brain drain have a direct impact on research output. After the brain drain, before a replacement can be fully competent to do the job, whether the research can be smoothly advanced, whether the project can be completed on time and the progress of achievements transformation and conversion are factors affecting the operation efficiency of institutions.

2.2 Lagged policy, low level of social acceptance

On the one hand, the corresponding supporting relaxation policy of the state and society for the public scientific institutions is not enough, on the other hand, subjected to traditional thinking and inertia, institutions' own institutional policy construction lags behind the research and development demand and the speed of adapting to the market development.

In such institutions, an establishment grant reduces and institutions' operation mainly relies on their own operation ability to self finance, but is still grouped among the audit and financial framework of the traditional institutions and implements dogmatic management, resulting in poor use of some funds and some assets hard to be revitalized. In seeking national and local projects, this type of national scientific institution is considered inadequate academic rigor and not enough strong scientific research ability compared with the traditional scientific institutes due to its maverick and sharp contact with the market; in seeking cross-cutting project and market project, it will be considered too "high-ended" research content of public scientific institutions by the traditional concept and concerned about its market application.

2.3 Cultivation of soft environment is difficult

The “national” positioning and mission of the public scientific institutions make its propaganda and cultural construction bound to be built along the high-ended route while the cultural construction is conflicting with its essence of market competition, resulting in internal staff at a loss and complex external reviews. This makes institutions relatively difficult to cultivate the soft environment with its own characteristics. It is more difficult to use good soft environment to enhance the employee’s loyalty and efficiency.

3. Results and Discussion

3.1 Results.

Because there are still some problems, new scientific institutions should pay attention to learning the best part of the traditional scientific institutions and universities as well as learning experiences from the management system of modern enterprises at the same time of innovation.

3.1.1Enhancing humanistic care, enhancing staff sense of belonging, reducing staff turnover

A lot of employees have a sense of alienation that they think themselves people “within the system” while they are not completely accepted by the “system” and are at a loss. Therefore, institutions should draw on traditional scientific institutions and universities to enhance humanistic care, enhance organizations and cultural construction, create an academic environment and working and living environment with a good scientific atmosphere, enhance staff sense of belonging and responsibility and reduce the degree of staff loss and turnover.

3.1.2Enhancing the development of the introduced talent’s family placement supporting work so as to enhance the introduction of talent and prevent the brain drain

For scientific institutions, most high-ended talents are introduced from overseas or domestic well-known colleges and universities. They come to a new city, in addition to completing scientific tasks and ideals, whether their family can be well arranged is an important consideration factor of high-ended talent to select the “habitat”. Therefore, =the introduced talent’s family placement supporting work should be paid more attenrions when making talent introduction.

3.1.3Increasing the level of scientific management

In the process of scientific institutes to establish modern institute system, it should refer to modern enterprise management system, learn, create and introduce the advanced management methods and ultimately improve the economic efficiency of management. The standard of the test is whether to ensure and promote the technological innovation in practice, whether to enhance the proportion of scientific and technological achievements into commodities and whether to further promote the public welfare functions to play.

3.2 Discussion

With the vigorous development of new scientific research institutions in China, many scholars have done some research on it. *Huifang H. et al.* [8] analysis of the development and achievement of China new scientific research institutions, and the existing problems. But the type of new scientific research institutions proposed by *Huifang H. et al.* [8] are not covered in the most distinctive part of new scientific research institutions: the double track mode of the Council and the national research institutions jointly led. The research of *Guopin Z. et al.* [9] is basically consistent with this study, and it also shows the achievements of the new scientific research institutions. But this study introduces the development of the new scientific research institutions and the achievements, but also introduces the existing problems, and hope to promote their better development through the correction of the problem. *Tong L. et al.* [10] and this article, summarizes the basic characteristics of new scientific research institutions, concerned about the new scientific research institutions in many ways to break the traditional management methods, and to deepen the reform of scientific and technological system related policies and suggestions. *But Tong L. et al.* [10] used the analytic hierarchy process to construct the evaluation model, and put forward the concrete index to measure the development of scientific research institutes. *Yunfeng L. et al.* [11] also inspected the new scientific research institutions in Shenzhen, and analyzed its success and deficiencies, but did not clearly put forward the way to solve the problem. In addition the analysis of the specific deficiencies are not the same.

4 Conclusion

Overall, the new public scientific institutions adapts a flexible operation mode to seek the government research funds on the one hand and to provide technological services for enterprises on the other hand, and introduces the financial capital in the operation process to explore a new way for the rapid industrialization of scientific and technological achievements. Its new operation mechanism provides a new path for China to explore scientific research system reform and plays an important promoting role in optimizing scientific institutions system, increasing the overall level of scientific institutions and deepening the reform of scientific research system. But this new thing still has many problems, which needs our serious attention, to constantly innovate and improve, to learn lessons and nutrition from the management of traditional scientific institutions, universities and modern enterprises, to guide action with the perspective of development and innovative ideas so that China’s new public scientific institutions can give full play to its advantages to contribute more to the development of China’s science and technology.

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